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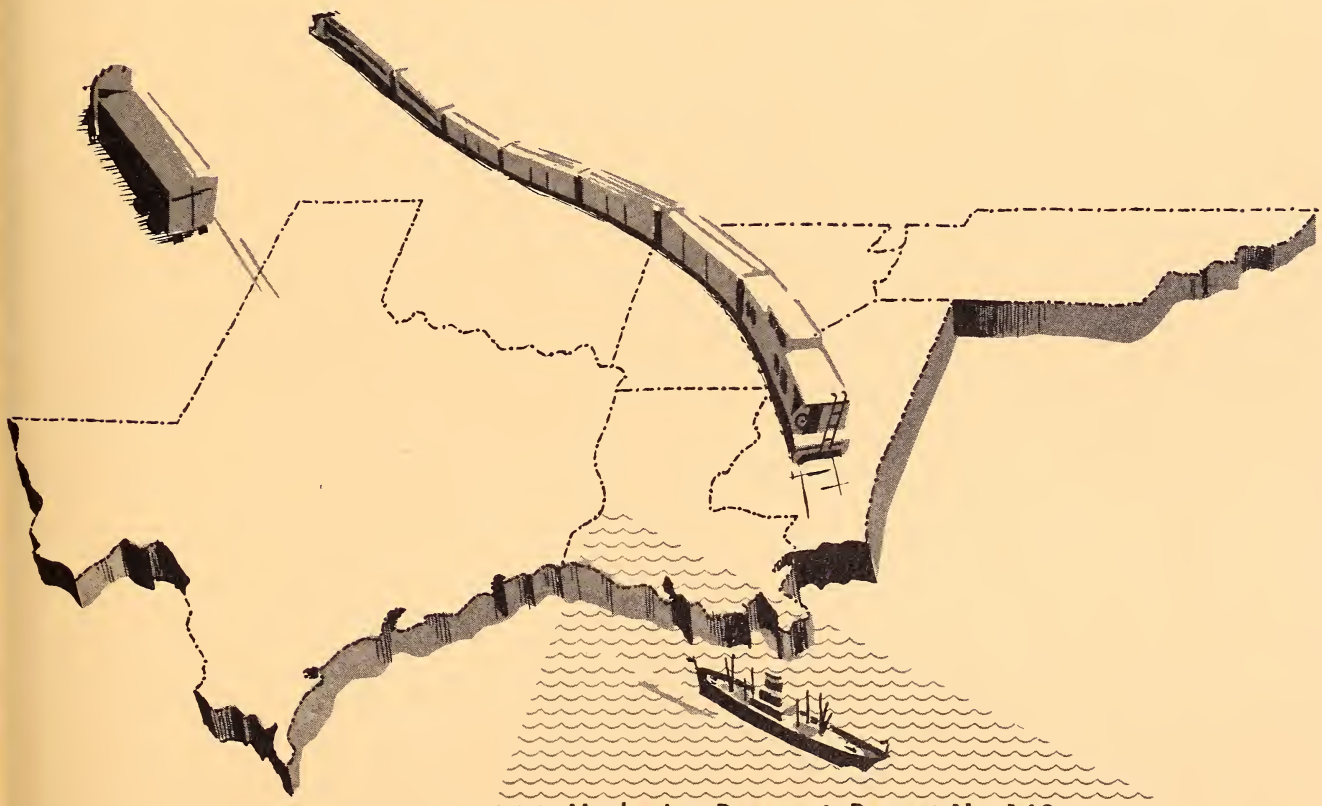
Transportation of RICE in the South ... AN ECONOMIC SURVEY



Marketing Research Report No. 140

UNITED STATES DEPARTMENT OF AGRICULTURE
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* * *

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SUMMARY

Railroads still haul most of the rice grown and milled in the South as a whole. Approximately 70 to 80 percent of the dried rough rice and milled rice shipped or received by mills and detached driers and warehouses moved by rail in the 1953-54 season. Trucks accounted for most of the remaining movement. A small proportion (4 percent) of the milled rice was shipped by rail-water routes to domestic destinations.

There is a close relationship between size of mill and the use made of railroads and trucks in receiving dried rough rice. The larger the mill, the greater the proportion of such rice received by rail and the smaller the proportion by truck.

The chief reason that the railroads hauled most of the rice was apparently their lower rates, in comparison with those of trucks, especially to distant markets. Although these lower rates were chiefly attributable to transit privileges, they also existed in many cases where no such privileges were available. However, rail rates were higher than water or rail-water rates.

Although rail rates were generally lower than truck rates, they were apparently profitable to the rail carriers. According to the Interstate Commerce Commission, the revenue received by the railroads from the carload movement of rice in 1952 was over 200 percent of long-run out-of-pocket costs (including a return on much of the railroad investment) and 130 percent of the fully distributed cost.

Other reasons frequently advanced for the predominance of railroad transport included more efficient utilization of loading and unloading crews; better adaptation to large-volume movements; the fact that available facilities were set up for rail movement; and a more dependable supply of equipment on the part of the carriers.

However, some disadvantages of rail movement were also mentioned by representatives of mills, warehouses, and driers--in part, the same persons as those who cited the rails' advantages and, in part, other people in the trade. The disadvantages most commonly indicated were shortages and poor quality of rail cars; lack of railroad spurs; that service was slow and not well coordinated with vessel schedules; and considerable loss and damage.

A large number of people operating mills, warehouses, and driers stated that trucks, too, offered certain advantages, especially faster, more flexible and convenient service, lower rates to nearby markets, and lower minimum weights.

Disadvantages of trucks that were mentioned most often were unsuitability for large movements, higher rates (especially on longer hauls), lack of dependability, and the requirement that trucks be loaded or unloaded immediately upon arrival.

Only a few trade representatives discussed the pros and cons of rail-water routes. All of these mentioned the fact that such routes had lower rates than all-rail or truck routes, and some indicated that rail-water service was faster than all-rail service. The only disadvantage cited was that enough space was not always available for prompt shipment by vessel.

Dried rough rice, which moves from detached driers to mills or to detached warehouses, is transported chiefly for short distances. The movements by truck were shorter than the rail hauls. Almost all of the truck movement was for less than 50 miles. About half of the rail movement was for 50 miles or farther, but only a very small percentage as far as 300 miles.

Milled rice is shipped much longer distances. About one-half of the rail traffic moved 500 or more miles.

Most of the dried rough rice was transported in bulk in the 1953-54 season, with only a minor portion shipped in bags. All of the dried rough rice movement from or between Arkansas points was in bulk.

Of the total volume of milled rice for which the type of container was reported, about 15 percent was shipped in consumer packages of less than 5 pounds, almost 5 percent in bags of 5 to 99 pounds, 75 percent in 100-pound bags, and the remainder in other containers. Export shipments, accounting for roughly half of the total shipments of milled rice in the 1953-54 season, were generally in 100-pound bags.

Approximately 90 percent of the mills, driers, and warehouses operated some type of power-driven equipment for loading or unloading railroad cars or trucks.

Almost half of the mills, driers, and warehouses cleaned some boxcars (beyond a nominal extent) for outgoing shipments. The operators of those establishments which cleaned some cars stated that they cleaned an average of about 65 percent of the boxcars loaded. The average cost per car was reported as almost 80 cents for cars loaded with bulk rice, and about 90 cents for cars loaded with bags or containers.

About 1 of every 6 mills, driers, and warehouses recoopered (beyond a nominal extent) some boxcars for outgoing shipments. The operators of those which recoopered some cars stated that they recoopered an average of almost 10 percent of the boxcars they loaded. The average cost per recoopered car was reported as about $1.75 per car for those cars used for bulk rice and almost $1.15 per car loaded with bags or containers.

Data on the distribution of traffic volume, charges, and other factors bearing on the competitive transportation situation of rice were obtained by interviews at 105 mills and detached driers and warehouses in Arkansas, Louisiana, Mississippi, Tennessee, and Texas. These mills accounted for 80 percent of the total receipts of rice by mills in these States in the 1953-54 season. The driers and warehouses visited amounted to one-fourth of the total number in the area.

TRANSPORTATION OF RICE IN THE SOUTH
An Economic Survey

By Ezekiel Limmer, Transportation and Facilities Branch, Agricultural Marketing Service

and

Robert J. Byrne, Transportation Branch, Farmer Cooperative Service

During World War II, rice production in the United States was increased considerably to meet expanded requirements in the Western Hemisphere, formerly supplied in part by Asian crops. Increased demand caused farm prices to rise sharply. Production continued to rise after the war, but prices have followed a much more unsteady course than has production. After rising to a peak in 1947, farm prices fell sharply in the following 2 years. They rose again because of the Korean hostilities, reaching a second peak in 1952. Since then, prices of rice have declined.

The combination of increased production and falling prices has stimulated a program in the U. S. Department of Agriculture to develop less costly or more effective marketing methods as well as other means of increasing farm income from rice. As part of this program, an economic survey of the transportation of rice was undertaken jointly by the Agricultural Marketing Service and the Farmer Cooperative Service. This survey was intended to furnish information about rice transportation which would be useful to the rice industry, the various carriers, and the general public.

One objective was to supply the rice industry with data and an analysis which could be used by it in efforts to lower its transportation costs and to get better service. Another purpose was to give the carriers facts which would permit them to compete in a better informed way for the rice traffic--a competition which, too, might result in lower transport charges and better service. Another goal was to give the general public a better picture of the transportation problems of the rice industry.

The current phase of the study was limited to the States in the South where rice mills, warehouses, and driers were located--Texas, Louisiana, Arkansas, Tennessee, and Mississippi (fig. 1). After preliminary consultations with leaders in the rice industry, a reporting form was prepared to be answered by operators of mills, warehouses, and driers. The information called for included: Volume transported by various modes of transportation in the 1953-54 season, and recent trends; distance of hauls, according to mode of transport; advantages and disadvantages of alternative types of transportation; comparative rates; condition of equipment used to ship rice, and costs necessary in cleaning and recoopering such equipment; types of containers used; extent of utilization of mechanical methods to load and unload rice; and suggestions for improvements in loading and unloading methods, with special reference to covered rail hopper cars.

In addition to presenting and analyzing information collected from mills, driers, and warehouses in the above survey, this report contains other data on the transportation of rice. These data, obtained from various sources, consist of (1) comparisons between the volume of railroad traffic and farm sales of rice, (2) statistics of railroad movement among States and of water movement by port, (3) railroad, truck, water, and water-rail rates, (4) figures on profitability of railroad rates on rice, and (5) average railroad carload weights.[1]

[1] The grouping of several States needs to be kept in mind throughout this report. In Tennessee, there was one rice mill but no detached rice driers or warehouses, either within or outside the survey. In Mississippi, there were a few detached driers and warehouses, but no rice mills anywhere in the State. Data regarding such establishments in Tennessee and Mississippi were consequently combined with those for the adjoining State of Arkansas, where mills and detached warehouses and driers were considerably more numerous. All of this report's references to the survey of mills, driers, and warehouses in Arkansas include such establishments for the entire 3-State area of Arkansas, Tennessee, and Mississippi. In the other portions of the report--those not based on the survey of mills, driers, and warehouses--these 3 States are treated separately instead of being combined.

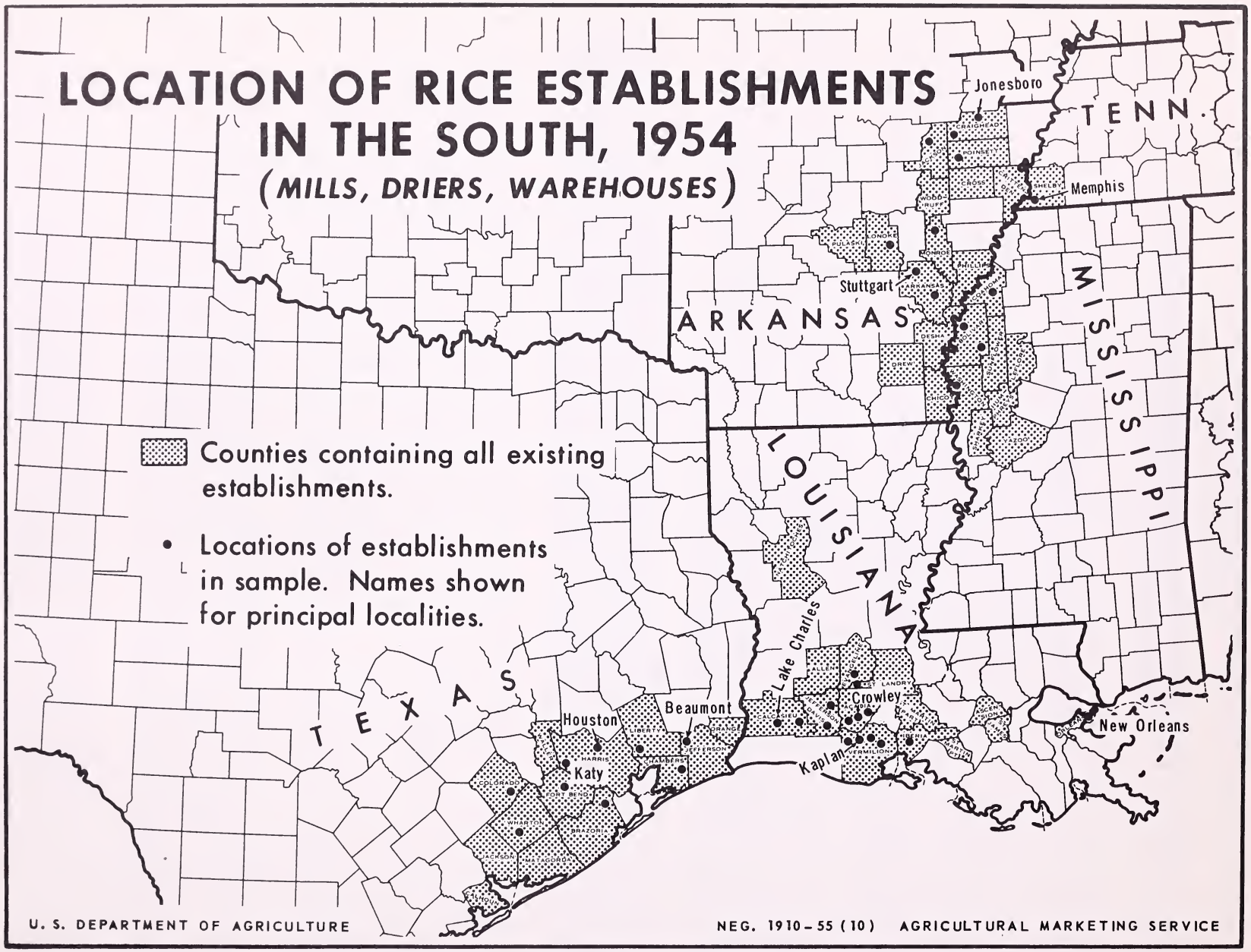
LOCATION OF RICE ESTABLISHMENTS
IN THE SOUTH, 1954
(MILLS, DRIERS, WAREHOUSES)
Counties containing all existing establishments.
• Locations of establishments in sample. Names shown for principal localities.
TEXAS
ARKANSAS
LOUISIANA
MISSISSIPPI
TENN.
Jonesboro
Memphis
Stuttgart
Lake Charles
Crowley
Kaplan
Houston
Beaumont
Katy
New Orleans
U. S. DEPARTMENT OF AGRICULTURE
NEG. 1910-55 (10) AGRICULTURAL MARKETING SERVICE

Figure 1

The actual collection of data from rice mills and detached driers and warehouses, which took place July 20-August 3, 1954, was by personal interview.[2] It covered a sample chosen by selecting some of the more important localities and establishments, plus a random sample of the remainder. Reports were obtained from 105 establishments (including 15 operated by cooperatives) in 44 localities (table 10, Appendix I). The number of establishments and points each comprised one-third of the respective totals in the South. In each of the States involved, the sample included roughly the same percentage of the State's total number of rice mills and detached driers and warehouses as it did in the other States. As for the localities where such establishments are situated, the sample likewise covered a fairly uniform percentage of these in each State.

The statistics based on the interviews were expanded to represent estimates for the whole Southern rice industry. The figures presented in most of the tables (as well as in the text) in this report are based upon these expanded figures. Where expanded figures are not used, that fact is noted.

The methods used in expanding the sample and the problem of sampling variability or "error" are discussed in Appendix I.

METHODS OF TRANSPORTING RICE

Green Rice from Farms to Driers and Mills

Before World War II, and in the early years of that war, most of the rice grown in the South was harvested by cutting with a binder, shocked and air-dried in the field, threshed and sacked, and stored in bags in warehouses.[3] The shortage of labor during the war led to the introduction of the combine method of harvesting. This method grew very rapidly, so that by 1952 it was utilized for approximately 90 percent of the rice harvested in the South.[4]

Rice, when harvested by combines, generally contains between 20 and 30 percent moisture and cannot be stored without heavy losses.[5] Consequently, the combine method requires that the green rice be dried in mechanical driers, within a few hours after harvesting, to reduce the moisture considerably. In this survey, all of the green rice received by detached driers and by mills with driers had been transported by motortrucks from the farms.[6] These trucks were generally owned by the farmers themselves, although in a few cases they were owned by the receiving mills or driers, or by for-hire carriers.

Dried Rough Rice from Detached Driers and Warehouses to Mills

Dried rough rice is transported from detached driers to mills either directly or via warehouses. Where rice is dried in driers physically attached to mills and is milled on the premises, the only transportation necessary for dried rough rice is within a plant. But this situation exists only for a small proportion of the total volume of rice marketed. The drying facilities in most of the mills which have such facilities are able to take care of only a minor part of the dried rough rice requirements of such mills.

In this survey, the movement of dried rough rice was measured from two standpoints. First, rice movement was considered as shipments from detached driers and warehouses. This includes the movement (1) from driers to warehouses or mills and (2) from warehouses to mills. The other measure of the movement of dried rough rice was as receipts by mills.

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[2] A few reports were mailed in, either because the persons supplying the data wished to complete the forms subsequent to the interviews, or because they could not be reached by the interviewers.

[3] Efferson, J. Norman, The Production and Marketing of Rice, The Rice Journal--1952, p. 438.

[4] Efferson, J. Norman; Hathorn, R.; and Gerlow, A., An Economic Study of Rough Rice Storage in the Southern States, Marketing Research Report No. 75, U. S. Department of Agriculture, Agricultural Marketing Service in cooperation with Louisiana Agricultural Experiment Station, November 1954, p. 1.

[5] Efferson, J. Norman, The Production and Marketing of Rice (cited above), p. 464 ff.

[6] Generally, the harvested rice is hauled from combines to trucks in bulk grain carts, which are pulled by tractors. Ibid. p. 506.

One difference between these two sets of figures is that there is some duplication between shipments from driers to warehouses or mills, and shipments from warehouses to mills. The rice that moves from drier to warehouse will thereafter generally move from warehouse to mill. But this duplication was apparently of minor importance in the 1953-54 season.[7]

Another source of difference is the fact that the statistics both of shipments by detached driers and warehouses and of receipts by mills were obtained from samples of establishments. Consequently, the figures are subject to sampling errors, which may be of different magnitude for shipments by detached driers and warehouses than for mill receipts.

Both sets of figures are presented here because they furnish a check on each other.

Shipments of Dried Rough Rice from Detached Driers and Warehouses.--Of the estimated total volume of shipments from driers and warehouses in the Southern States in the 1953-54 season, 69 percent was hauled by railroad and 30 percent by truck. (See table 1 below and table 12 in Appendix II.) There were substantial differences in these figures among the several States. The percentage moving by rail varied from 92 for Texas to 46 for Louisiana and 49 for Arkansas.

TABLE 1.--Percentages of rice shipped by different modes of transportation in the Southern States, 1953-54 season

Type of rice and of movement	Percentage of total volume for which mode of transportation was reported[1]				
	Railroads	Trucks	Rail-water	Other	Total
Dried rough rice:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Shipments by detached driers and warehouses....	69	30	--	[2] 1	100
Receipts by mills.....	77	23	--	--	100
Milled rice shipped by mills.	80	16	4	--	100

[1] No all-water movement was reported.
[2] Conveyor belt to mill.

Receipts of Dried Rough Rice by Mills.--The distribution of mill receipts of dried rough rice according to mode of transportation corroborates the foregoing figures in a general way. Of the total receipts by mills in all the Southern States, 77 percent was by rail and the remainder by truck.

The rail percentages of mill receipts for individual States are as follows: Texas 98 percent, Louisiana 69 percent, and Arkansas 62 percent. Differences between the data for receipts by mills and for shipments by detached driers and warehouses in the several States may be accounted for by one or more of the following factors: (1) Sampling errors (see Appendix I)--the data should be considered as approximations, and not as precise figures; (2) interstate shipments--some of the shipments by detached driers and warehouses in one State were shipped to mills in other States; (3) shipments from detached driers and warehouses include some duplications, as noted above.

[7] In the 1953-54 season, the movement from driers to warehouses was apparently of very small volume. According to the survey, only 8 percent of the total receipts of detached warehouses or driers (all of which have some warehouse space) consisted of dried rice.

Milled Rice from Mills

Of the total shipments of milled rice from all the Southern States for which information was obtained, 80 percent was shipped by rail. Trucks accounted for 16 percent and rail-water movement for 4 percent. The foregoing figures cover movements to the extent that they had destinations in any of the 48 States or the District of Columbia. Shipments which moved by rail to docks for export by vessel were considered as rail movements, since the last destination in the United States was reached completely by rail. On the other hand, rail shipments which were subsequently moved to domestic destinations by water were listed as rail-water movements. Most of the volume of rail-water shipments consisted of rail switching movements to docks followed by water movements.

As with the movement of dried rough rice, Texas had the highest proportion of milled rice moving by rail--88 percent. In addition, 10 percent moved by rail-water routes to domestic destinations, making a total of 98 percent originating by rail. The proportion originating by rail from Arkansas mills was 87 percent, of which 1 percent was rail-water, and from Louisiana mills 72 percent, of which 3 percent was rail-water.

Types of Motor Carriers Used

By far the greater part of dried rough rice transported by motor carriers was hauled in trucks not for-hire--the shippers' or receivers' vehicles (tables 13 and 14, Appendix II). These trucks were owned by mills, driers, or warehouses, or by farmers holding title to the rice. For-hire haulers accounted for 20 percent of the truck receipts by mills and about 30 percent of the truck shipments by detached driers and warehouses, for the Southern States as a group.

On the other hand, for-hire motor carriers hauled more than half of the milled rice shipped by mills in trucks (table 15, Appendix II). This was true for the Southern States as a group because of the fact that over 90 percent of all milled rice shipped by Arkansas mills in trucks was hauled by for-hire carriers. Private motor carriers accounted for the movement of over half of the milled rice shipped by truck from Louisiana and Texas mills. Trucks owned by reporting mills were, alone, responsible for over half of the rice shipped by Louisiana mills in trucks, while trucks owned by buyers (presumably these were chiefly wholesalers and industrial users) accounted for over half of the truck shipments by Texas mills.

Effect of Size of Establishment on Utilization of the Various Modes of Transport

In this survey, an attempt was made to determine whether there was any relationship between size of establishment and extent of utilization of the various modes of transport. Was there any difference in the extent of use of trucks, for example, between large and small establishments?

Analysis indicated that there was very little relationship between the size of detached drier or warehouse and the use made of the various modes of transport in shipping dried rough rice. The same conclusion was reached with respect to size of mill and shipments of milled rice. An important reason for these conclusions may be that it is often not the shippers who determine the mode of transport, but rather the receivers.

On the other hand, there is a definite relationship between size of mill and the percentage of mill receipts of dried rough rice by rail and by truck. As shown in table 2, trucks accounted for over 50 percent of the dried rough rice received by the smallest Southern mills, defined here as those receiving 30,000 tons or less in the 1953-54 season. The truck percentage declined sharply as the size of mill increased, with one exception. The figure was 18 percent for mills with receipts of 30,001-60,000 tons, 17 percent for those with 60,001-90,000 tons, and 2 percent for those with 90,001-120,000 tons. The percentage was 13 percent for 3 mills with receipts of over 120,000 tons each. This relatively high figure was due to a high ratio (25 percent) for the very largest mill, the other two mills having ratios of 1 and 0 percent, respectively.

TABLE 2.--Relationship between size of mills and percentage of receipts of dried rough rice by truck

Size of mill (tons of dried rough rice received, 1953-54 season)	Number of mills--all Southern States	Truck receipts as percent of total			
		Arkansas[1]	Louisiana	Texas	All Southern States
1 - 30,000.....	15	58.8	48.1	--	51.7
30,001 - 60,000.....	9	22.3	22.2	5.0	18.2
60,001 - 90,000.....	8	35.9	11.5	0	16.9
90,001 - 120,000.....	2	--	--	2.4	2.4
120,001 and over	3	25.0	--	0.6	12.8

[1] Includes Tennessee.

This inverse relationship between size of mill and percentage of receipts by truck may be seen for each of the individual States. It is a close relationship for Louisiana, and it exists, but to a lesser extent, for Arkansas and Texas as well.

The chief reasons for this close relationship may be (1) larger mills are more likely to receive large quantities, which move more cheaply and conveniently by rail; (2) hence such mills are more likely to have rail spurs[8]; (3) larger mills generally find it necessary to reach out for longer distances for their supply of rice, and longer hauls are more advantageously moved by rail.

Comparison Between Trends in Farm Sales and Rail Transportation of Rice

An indication of the changing importance of the railroads in the transportation of rice may be had by comparing railroad tonnage with the volume of farm sales adjusted for changes in stocks on hand (table 16, Appendix II). It should be noted, however, that some rice is counted more than once in rail tonnage, and that the adjustment for changes in stocks is reflected only approximately in transportation requirements.[9] Consequently, the actual percentage relationship of rail tonnage originated to farm sales is not as significant as the trend in this percentage.

It should be pointed out that the farm sales refer to crop years which begin August 1. The rail tonnage figures relate to calendar years. However, the bulk of the movement of rice apparently occurs during the first few months of the crop year. Therefore, the difference in period covered is not a serious obstacle to comparing the two series.

In 1928 (the first year for which this comparison could be made) railroad tonnage was 120 percent of the (adjusted) volume of farm sales. This rose to 124 percent in 1929, but declined sharply during the depression of the 1930's. It reached a low point of 66 in 1937.

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[8] In railroad language, a "spur" or "sidetrack" means a track alongside or diverging from the main line, connected at one end or both ends with the main line, and used for loading, unloading, and related purposes. The people interviewed in this study, like many other users of such a facility, call it a "siding" instead. Regardless of the name, such a track generally leads to a processing or storage establishment of some sort--in the rice trade, this being a mill or a detached drier or warehouse.

[9] Some rice tonnage is counted more than once chiefly because of two factors: (1) The same rice is counted both as rough rice and as milled rice; (2) rice is counted more than once when it is stored under transit privileges, under which much rice is shipped. See section, "Rates and Rate Structures," page 13.

Farm sales were adjusted by adding the net decrease in stocks of rice (principally in country warehouses and at mills), or subtracting the net increase during each year. The reason for these adjustments was that changes in stocks are generally reflected in the volume of transportation performed. Thus, decreases in stocks mean that more was moved out of inventory, which typically requires a substantial amount of transportation, than was moved into inventory, which generally requires only short hauls.

Subsequent to 1937, the percentage of rail tonnage to sales rose, but erratically. During World War II, the percentage increased markedly, reaching a peak of 101 percent in 1945. The figure then began to decline, falling to 68 percent in 1951, but jumped again the following year to 89 percent. Another decline ensued, and in 1954 the percentage was 78. This was considerably lower than in the late 1920's, but was higher than in many of the depression years of the 1930's.

ADVANTAGES AND DISADVANTAGES OF THE SEVERAL MODES OF TRANSPORTATION

An attempt was made in this survey to learn the reasons for the relative volumes of movement of rice by the various modes of transport, as presented in the earlier sections of this report. This was done by questioning representatives of mills, driers, and warehouses about their opinions of the advantages and disadvantages of the various modes of transportation. This section contains an analysis of these opinions.

This analysis is confined to the transportation of dried rough rice and of milled rice. These are hauled by several modes of transport. As stated above, all green rice is hauled by truck. Such rice must be hauled from the fields to driers within a few hours after harvest. Trucks are apparently the only transport medium which can offer such speedy service for short hauls.

Of the operators of the 105 mills and detached driers and warehouses in the sample, those at 68 plants expressed opinions as to advantages and disadvantages of the various modes of transport.[10] Of the remainder, 28 stated they had no preference, because they did not control either inbound or outbound shipments. Shipments were controlled by the shippers and receivers, respectively, who paid the freight rates. No answers were supplied by 9 establishments.

Railroad Advantages

Lower Rates.--Of the operators of 68 establishments mentioning advantages and disadvantages of some mode of transportation, operators of 44 indicated some advantages for rail transportation (table 3). Of these 44, the operators of almost two-thirds stated that lower rates were an important advantage of shipping by railroad. This was the reason most frequently mentioned. Generally these low rates were attributed to the existence of transit privileges extended by railroads.[11] As defined in greater detail in the section on "Rates and Rate Structures," transit privileges permit rice to be transported to a storage or milling point and, following storage or milling, to be hauled to destination at a total charge for all movements which generally is less than the sum of the rates for the individual movements to and from the mill. These privileges are applicable only if all movements are by railroad. However, rail rates lower than truck rates were also cited in a number of cases where rail transit privileges did not apply. Lower rail rates, without transit privileges, were stated to apply to some movements to docks within port areas.

More Efficient Utilization of Loading and Unloading Crews.--Of those who mentioned advantages of using rail transport, the operators of almost 60 percent of the establishments stated that such use permitted more efficient utilization of loading and unloading crews. This advantage was advanced more frequently than any other except lower rates.

Several aspects of this advantage were indicated. One was that rail cars could be loaded or unloaded more at the convenience of the shipper or receiver. In contrast, trucks had to be loaded or unloaded immediately. If a larger number of rail cars arrived, it would not be as necessary (as in the use of trucks) to expedite loading or unloading operations.

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10 The figures in this section have not been expanded. They are the actual number of establishments in the sample.

11 A similar arrangement in Arkansas is called "cut-backs".

Such expediting generally requires transfer of personnel from other activities (resulting in some disruption of such activities), or obtaining additional personnel, or paying overtime wage rates.[12]

TABLE 3.--Advantages of shipping or receiving rice by railroad as reported by operators of mills and detached driers and warehouses in the Southern States, July-August 1954

Advantages reported	Mills and detached driers and warehouses whose operators reported the advantages indicated	
	Establishments	Percentage of total reporting any railroad advantages
	Number	*Percent*
1. Lower rates	28	64
2. More efficient utilization of loading and unloading crews	25	57
3. Better adapted to large-volume movements	11	25
4. Available loading and unloading facilities are set up for rail movement	10	23
5. More dependable supply of equipment	8	18
6. Railroad weights are a check upon shippers' weights	3	7
7. Can fumigate (rice) more easily	3	7
8. Use the same rail cars in which inbound dried rice arrived to ship milled rice	1	2
9. Longshoremen prefer rail cars	1	2
10. Sight draft can be drawn as soon as rice is loaded	1	2
11. Better dock facilities for joint water movement	1	2
12. Faster for long distances	1	2
13. Goes directly to buyer's siding	1	2
14. Facilitates sampling for testing	1	2
Total reporting any railroad advantages	44	100

A number of operators reported that rail cars could be used for direct loading of rice, without any storage. This was important for both dried rough and milled rice. Rice could be loaded onto cars immediately after drying or milling, without entering and then leaving storage. This saved both handling and storage costs. In addition, the amount of storage space needed could be reduced.

Several operators stated that railroad cars were faster or cheaper than trucks to load and unload. One reason for this is that rail cars are bigger and more cars could be assembled than trucks. This permits loading and unloading crews to handle a large movement uninterruptedly.

[12] However, if rail cars are held beyond 48 hours of "free time," shippers or receivers are liable to demurrage charges, to be paid to the carriers. In the 1953-54 season, these charges amounted to $3 per car per day for each of the first 4 days beyond free time, and to $6 per day for each additional day. But these payments are generally reduced by large shippers and receivers through "average" agreements with the railroads. Under these agreements, shippers and receivers are allowed one credit for each car released within the first 24 hours of free time. These credits may be used (with certain limitations) to cancel debits which accrue for each day beyond free time.

Railroads Better Adapted to Large Shipments.--Of those who indicated railroad advantages, the operators of one-fourth of the establishments stated that rail transportation was better adapted to large-volume movements. Shipments by detached driers to mills and by mills to consuming points were generally in large quantities. Here again, the fact that rail cars are bigger than trucks and that more cars can be assembled than trucks was a factor. Furthermore, as was stated above, crews could load or unload a large volume without being interrupted by lack of cars. In contrast, the loading or unloading of trucks generally would have to be interrupted frequently to await the arrival of additional trucks.

Available Facilities Designed for Rail Movement.--Of those who indicated railroad advantages, the operators of almost one-fourth of the establishments stated that their available facilities for handling dried rough or milled rice were set up for railroad movements. Additional facilities would be required to handle truck movements.

More Dependable Supply of Equipment.--Of those who indicated advantages of shipping by railroad, the operators of almost one-fifth of the establishments mentioned that it offered a more dependable supply of equipment. It was stated that (if available) rail cars were generally delivered when and as promised for loading. Incoming shipments in railroad cars also were stated to be switched on spurs as promised. This dependability permitted more accurate schedulings of loadings and unloadings. In addition, since shippers and receivers could estimate closely the size of the loading or unloading job, they could plan their requirements for labor accordingly.

Other Railroad Advantages.--Other advantages of shipping by railroad were advanced by some shippers: Railroad weights were a check upon shippers' weights; railroad shipments could be fumigated more easily; the same rail cars in which inbound rough rice arrived could be used to ship milled rice; longshoremen at ports preferred rail cars; a sight draft could be drawn as soon as rice is loaded; there were better dock facilities for rail-water movement than for truck-water movement; rail shipment facilitated sampling for testing; the railroad went directly to the buyer's spur. This last-named factor, of course, did not, by itself, give the railroads any advantage; but it did mean that, on this score, railroad and truck movements were on a par, so that rail advantages on other points could come into play.

Railroad Disadvantages

Shortages and Poor Quality of Railroad Cars.--Of the operators of 68 establishments indicating preferences for any mode of transport, operators of 34 mentioned disadvantages of rail service (table 4). Of these 34, the operators of over 40 percent mentioned shortages of railroad cars and 15 percent referred to poor quality of cars. However, of those who mentioned car shortages, many referred specifically to shipping seasons prior to the 1953-54 season. The operators who referred to poor quality of cars mentioned such factors as lack of cleanliness, leakiness, nails in the walls, and infestation of cars with weevils and insects. Other sections of this report describe the proportions of cars cleaned by shippers and average costs of cleaning cars.

No Railroad Spurs.--Of those indicating railroad disadvantages, operators of almost 30 percent of the establishments had no railroad spurs. All of their receipts and shipments were by truck. To use railroad service, either inbound or outbound, would require transfer of the rice from or to trucks, a costly operation.

More Expensive or Slower Loading or Unloading.--Of those indicating railroad disadvantages, operators of almost 20 percent of the establishments stated that rail cars were more expensive or slower to load. One reason advanced for the greater expense of loading was the need of grain doors for box cars. A factor in the higher cost in unloading was the method of unloading dried rough rice from rail cars by hand. This was in contrast to the practice of unloading dried rough rice--either dried or green--from trucks by a dump mechanism or by lifting the front of the trucks by a mechanical hoist and letting the rice slide out.

TABLE 4.--Disadvantages of shipping or receiving rice by railroad as reported by operators of mills and detached driers and warehouses in the Southern States, July-August 1954

Disadvantages reported	Mills and detached driers and warehouses whose operators reported the disadvantages indicated	
	Establishments	Percentage of total reporting any railroad disadvantages
	Number	*Percent*
1. Shortages of railroad cars	14	41
2. No rail spur	10	29
3. More expensive or slower to load or unload	6	18
4. Slow service	6	18
5. Poor quality of cars	5	15
6. Schedules not well coordinated with schedules of vessels at port	4	12
7. High loss and damage, especially on stopovers	3	9
8. Difficult to schedule receipts; cars pile up	2	6
9. Rates higher in some cases	2	6
10. Railroad scales are located far away	2	6
11. Movements to docks require transfer from one rail line to another	1	3
12. Slower settlement with farmers because mills insist upon railway weights	1	3
13. Cost of fumigation excessive	1	3
Total reporting any railroad disadvantages	34	100

Slow Service, Not Well Coordinated with Vessel Schedules.--Of those indicating railroad disadvantages, operators of almost 1 out of 5 establishments cited slow service and 1 out of 8 alleged that rail schedules were not well coordinated with schedules of vessels at port. Of those who mentioned slow service, some referred especially to small shipments, which were also reported as inconvenient to handle by rail. Typical of the complaints about poor coordination with schedules of vessels were statements by operators of some establishments located at ports that only one switching service was furnished daily. If a shipment was not ready for that switch, it was delayed one full day in reaching port, and might miss a ship-sailing.

High Loss and Damage.--Of those indicating railroad disadvantages, operators of almost 10 percent of the establishments spoke of large losses and damage, especially to milled rice. Mention was made of pilferage during stopovers.

Other Railroad Disadvantages.--Additional railroad disadvantages were also mentioned: It was difficult to schedule receipts (cars pile up); rates were higher in some cases; railroad scales were located far away; movements to docks required transfer from one rail line to another; settlement by mills with farmers was slower because mills insisted upon railroad weights; the cost of fumigation was excessive.

Truck Advantages

Faster Service.--Of the operators of 68 establishments replying to this question, operators of 45 indicated some advantages for truck transportation (table 5). Of these 45, the operators of over one-third stated that trucks provided faster service, especially

for short hauls and for small shipments. Trucks were used by some shippers for emergency shipments, when speed was important, such as for making the schedule of a ship-sailing at port.

TABLE 5.--Advantages of shipping or receiving rice by motortruck as reported by operators of mills and detached driers and warehouses in the Southern States, July-August 1954

Advantages reported	Mills and detached driers and warehouses whose operators reported the advantages indicated	
	Establishments	Percentage of total reporting any truck advantages
	Number	*Percent*
1. Faster	16	36
2. More flexible and convenient	14	31
3. Lower rates	13	29
4. Lower minimum weights	10	22
5. No rail spur	10	22
6. Easier to load	4	9
7. Less loss and damage	3	7
8. Door-to-door delivery	3	7
9. Quicker settlements with farmers	2	4
10. Available during periods of railroad car shortages	2	4
11. Facilities have more capacity to load trucks	1	2
12. Shorter distance to docks via highway than via railway	1	2
13. Farmers bring rice at no cost to mill	1	2
14. More even flow of equipment	1	2
Total reporting any truck advantages	45	100

More Flexible and Convenient.--Of those mentioning truck advantages, operators of almost one-third of the establishments stated that trucks were more flexible and convenient, especially for short hauls and small shipments. Trucks were stated to be available when needed. Seed rice could be shipped in accordance with planting requirements. Split deliveries were practicable.

Lower Rates.--Of those indicating truck advantages, operators of slightly less than 30 percent of the establishments reported that truck rates were lower than rail rates. As a rule, these lower rates were stated to apply from or to points for which transit privileges are not available for rail movements, and on short hauls. In a few cases, however, it was admitted that the use of trucks meant the loss of transit privileges, an important feature in much of the rail movement.

Lower Minimum Weights.--Of those mentioning truck advantages, operators of almost one-fourth of the establishments stated that trucks offered lower minimum weights. This was especially important in the shipment of milled rice.

No Rail Spur.--Of those indicating truck advantages, operators of almost one-fourth of the establishments stated that they had no railroad spur--all their receipts and shipments were by truck.

Other Truck Advantages.--Other truck advantages reported were: Trucks were easier to load; there was less loss and damage; door-to-door delivery was provided; buyers' settlements with farmers were quicker; trucks were available during periods of railroad car shortages; facilities of shippers were set up primarily to load trucks; the distance to docks via highway was shorter than via railway; farmers trucked rice to mills without charging for this transportation; there was a more even flow of equipment.

Truck Disadvantages

Not Suitable for Large Movements.--Of the operators of 68 establishments replying to this question, operators of 34 indicated some disadvantages for truck transportation (table 6). Of these 34, the operators of over 40 percent stated that trucks were not suitable for large movements of rice. The reasons generally advanced were (1) the relatively small capacity of motor trucks and (2) the inability to obtain or handle many trucks at one time. As a result, loading and unloading crews could not handle large movements efficiently. Their work might be interrupted frequently to await the arrival of additional motor trucks.

Higher Rates.--Of those mentioning truck disadvantages, operators of almost one-third of the establishments referred to higher rates by truck. Many of these attributed these higher rates to lack of transit privileges. Truck rates were also stated to be higher than rail rates for long hauls.

Not Dependable.--Of those indicating truck disadvantages, operators of about one-third of the establishments stated that trucks were not dependable. These operators complained that they could not schedule receipts or shipments because the arrival of trucks was unpredictable.

Necessity for Loading or Unloading Immediately upon Arrival.--Of those mentioning disadvantages of shipping by truck, the operators of almost one-fifth of the establishments stated that trucks were required to be loaded or unloaded immediately upon arrival. This frequently was costly or inconvenient or both, requiring the transfer of men from other jobs, obtaining of additional personnel, or payment of overtime wage rates.

TABLE 6.--Disadvantages of shipping or receiving rice by motortruck as reported by operators of mills and detached driers and warehouses in the Southern States, July-August 1954

Disadvantages reported	Mills and detached driers and warehouses whose operators reported the disadvantages indicated	
	Establishments	Percentage of total reporting any truck disadvantages
	Number	*Percent*
1. Not suitable for large movements	14	41
2. Higher rates	11	32
3. Not dependable	11	32
4. Must be loaded or unloaded immediately upon arrival	6	18
5. Loading more costly	6	18
6. Have rail facilities (either no room for trucks or they are handled less readily)	4	12
7. Not always available in desired numbers	4	12
8. Buyers prefer rail shipments	1	3
9. Cannot fumigate properly	1	3
10. No independent check on weight of rice	1	3
Total reporting any truck disadvantages	34	100

Other Truck Disadvantages.--Other disadvantages of using trucks were also advanced: Trucks involved costly loading; shipper or receiver had rail facilities (either there was no room for trucks or they were handled less readily); trucks were not always available in desired numbers; buyers preferred rail shipments; trucks could not be fumigated properly; trucks provided no independent check on the weight of the rice.

Advantages of Using Rail-Water Routes

Of the operators of 68 establishments replying to this question, operators of 4 indicated some advantages for rail-water routes to domestic destinations. Four-fifths of the volume of rice moving by rail-water routes was milled at ports and involved no rail transportation other than switching service. The water-shipment phase of this movement was either by seatrain (vessels hauling loaded rail cars) or by conventional vessels. The water routes are typically from Gulf ports to North Atlantic ports.

In the opinion of each of the operators mentioning advantages of rail-water routes, one such advantage was lower freight rates. Operators of two establishments indicated faster service than on all-rail routes.

Disadvantages of Using Rail-Water Routes

Operators of two establishments mentioned disadvantages of using rail-water routes. Only one disadvantage was mentioned--that enough space was not always available on ships for prompt movement.

RATES AND RATE STRUCTURES

As indicated in the foregoing section, differences among the rates of the various modes of transport were reported to be very important in determining the distribution of traffic among the various modes. This section analyzes the rates of the various forms of transport and the differences among these rates.

Railroad Rates

Transit Privileges.--One of the principal characteristics of the railroad rate structure for rice is the system of "transit privileges." This term is used for shipments originating in Louisiana and Texas, while in Arkansas "cut-back" rates refer to a similar system of rate-making. (Cutback rates are limited to Arkansas, and are not used in Mississippi or Tennessee.) A basic feature of transit privileges is this: A shipment of rice can be halted (up to a limited number of times, generally twice) for warehousing or milling or both, and then reshipped to destination at a total charge for all movements which generally is less than the sum of the rates for the individual movements. Transit privileges are not available for all points between which movement might take place. However, such privileges are generally available for the principal movements.

In the case of transit privileges from Texas or Louisiana, a "through" rate is available to cover both inbound and outbound movements, generally over the same rail line within 12 months of each other. An example is the rate structure on rough rice shipped from Katy, Tex. to Houston for milling, and then reshipped to Chicago as milled rice. The local rate on rough rice from Katy to Houston is 15 cents per 100 pounds. The rate on milled rice from Houston to Chicago is 85 cents per 100 pounds. Without transit privileges, the combined rates on rough and milled rice would total $1.00 per 100 pounds. The through rate on milled rice from Katy to Chicago (via Houston) is 85 cents, the same as from Houston to Chicago. A transit charge of 5 cents per 100 pounds must be added to the through rate, making the total charge 90 cents. This is 10 cents per 100 pounds less than the combination of the rates for the separate movements.

In the cut-back rates from Arkansas, there are no through rates covering both inbound and outbound movements. Instead, the rate on the inbound movement of rough rice is

reduced, by a partial refund, if it is followed within 12 months by a shipment of milled rice under certain conditions. For example, the local rate on rough rice from Brinkley to Stuttgart, Ark., is 10.5 cents per 100 pounds. But, if milled rice is shipped from Stuttgart to Chicago within a year, a "net rate" of 5.5 cents is applicable between Brinkley and Stuttgart, 5 cents less than the local rate.

Some Details of the Operation of Transit Privileges.--In Louisiana and Texas, rates on individual movements must be paid when shipments are made. Transit claims are then filed by shippers with railroads separately for each outbound car for the difference between the payments made and the through rate plus the transit charge. A separate claim is required for each end product, viz., milled rice, hulls, etc.

In Arkansas, claims may be filed either on individual shipments or on an annual basis covering all shipments regardless of destination. If shippers post sufficient bond with originating lines for rough rice, they can obtain the net rate on individual shipments. Documentary proof of outbound movements via the lines handling the inbound rough rice must be submitted at the time of annual settlement.

The milling process results in shrinkage and some actual waste. This fact is taken into account by transit regulations for shipments originating in Texas or Louisiana.[13] Under these regulations, for every 100 pounds of dried rough rice received by a mill the following maximum quantities may be reshipped under transit privileges: Milled rice (including brewers' or broken), 68 pounds; hulls, 19 pounds; bran, 9 pounds; and polish, 2 pounds. The remaining 2 pounds is considered as the approximate amount of waste or shrinkage, and hence no reshipment under transit privileges is allowed with respect to it. Milled rice is generally shipped much longer distances than hulls and other byproducts.

In contrast, the system of cut-back rates in Arkansas permits shipping out 100 pounds of any end product or group of end products for every 100 pounds of dried rough rice received. Thus, as much as 100 pounds of milled rice may be shipped for every 100 pounds of dried rough rice received.

In all of the Southern States covered by this study, lower rates under transit privileges are available usually if the same railroad line is used for the outbound movement as for the inbound movement. Thus, the system of transit tends to induce not merely the all-rail shipment of rice, but shipment by the same railroad line.

As noted, to obtain transit privileges (including cut-back rates from Arkansas), outbound shipments must be made within 12 months of the inbound movements.

Transit charges are made for movements under transit privileges originating in Texas or Louisiana. These charges are typically paid at the same time that the charges for the outbound movement are paid. There are no transit charges for shipments under cut-back rates from Arkansas.

When either transit privileges or cut-back rates are used, the rate adjustment is applied to the outbound rate from the transit point, for example, the location of the rice mill. However, the prospect of this adjustment might be reflected to some degree in prices paid by the mill, and hence the shipper who pays the freight charges from the milling point does not necessarily get all of the benefit from this feature of the railroad rate system.

"Blanketing" of Railroad Rates.--The railroad rate structure on rice from Louisiana and Texas is characterized by a considerable amount of "blanketing" of origin points; that is, various origin points have the same rates to a given destination despite differences in their distance from it (table 17, Appendix II). This blanketing applies both to points which are primarily centers for drying and to milling centers. For example, the net rate (after adding transit charges and deducting refunds on account of transit privileges) is

[13] Southern Pacific Lines Tariff 692-L, I.C.C., Tex. 706.

90 cents per 100 pounds to Chicago on dried rough rice shipped from a number of important drying points in Texas (such as Katy, Eagle Lake, and Dayton) and milled at Houston. This 90-cent rate also applies on dried rough rice shipped from a number of important Louisiana drying points (including Eunice) and milled at Crowley, La., or New Orleans.[14]

The rates from Arkansas are lower than from Texas or Louisiana to important markets in the Northeastern and Southeastern parts of the country. For example, to Milwaukee, Wis., the rate from some important drying centers on rice milled at Houston, Crowley, and New Orleans is $1.00 per 100 pounds, while the rate through Stuttgart and Jonesboro, for substantially shorter distances, is as low as 78 cents.

There is also some blanketing of southeastern markets. For example, from each of the origins mentioned above, the rate to Charleston, S. C., is the same as the rate to Atlanta, Ga., although Charleston is several hundred miles farther away than Atlanta. To these markets the lowest rail rate is on rice originated in Mississippi (for example, Greenville) and milled in New Orleans.

Lower Rates on Brewers' Rice.--Most commonly, brewers' rice shipped by rail is covered by the same rate as other milled rice. However, in a few cases, a lower rate on brewers' rice is available, sometimes at a higher minimum carload weight. In this report, the rates shown for milled rice are those applicable to rice intended for uses other than in brewing, regardless of whether a lower rate for brewers' rice is available between the specified origin and destination. The rate on brewers' rice from major mill points in Arkansas, Louisiana, and Texas to most California points is $1.09 per 100 pounds, applicable to a carload minimum of 50 tons. This is substantially below the comparable rate of $1.185 per 100 pounds applicable to all types of milled rice in carloads, with a minimum weight of 30 tons. From Crowley, La., to Milwaukee, Wis., the rate on brewers' rice is 93 cents per 100 pounds, only 1 cent below the rate on other types of milled rice. The minimum weight is here the same in all cases. From Crowley to St. Louis, another important brewing center, brewers' rice has to move on the same rate, and with the same minimum weight, as other types of milled rice.

Truck Rates

Table 18 in Appendix II presents truck rates (as well as comparable rail rates) from selected origins in the Southern rice area to principal markets outside that area. In the table, each truck rate is the sum of a rate on dried rough rice from detached drier to mill and a rate on milled rice from mill to consuming market. For each origin and destination, the analysis uses the lowest truck rate found, if more than one was discovered.

Most of the dried rough rice traffic is intrastate. Hence the truck rates on dried rough rice analyzed here are all intrastate rates. Between some origins and destinations, trucking was by common carriers; between others, by contract carriers. The rates were obtained from tariffs or contracts on file with the public utility commissions of Arkansas, Louisiana, and Texas.[15] The Arkansas rates were obtained from rate schedules of motor carriers named by one of the large rice milling concerns as having typical rates and as hauling a significant volume of rice moving by truck between specified origins and destinations. The Louisiana and Texas rates were chosen upon the recommendation of officers of the respective State public utility commissions.

The rates on milled rice from mills to consuming points were obtained chiefly from tariffs filed by common carrier truck lines with the Interstate Commerce Commission.

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[14] But a higher rate to Chicago applies through New Orleans on rice originated at points farther away in Mississippi (such as Greenville) or Arkansas (such as McGehee). However, to southeastern points (such as Tampa, Fla., Charleston, S. C., and Atlanta, Ga.), the rates through New Orleans on rice originated at these Mississippi points are lower than from Louisiana country points nearer to New Orleans.

[15] Because of the relatively small volume of rice involved, no rates were selected either on movements to the one mill in Tennessee (a State which had no detached driers) or on movements from the detached driers in Mississippi (a State which had no mills).

For Louisiana and Texas origins, these were generally the rates filed by conferences or groups of truckers. For Arkansas origins, the rates are those of common carriers chosen on the basis of advice given by the Arkansas rice milling concern mentioned above. It is understood that some of the truck movement of milled rice from the various Southern States to consuming markets is provided by contract carriers at rates lower than the common carrier rates here utilized.

As indicated in an earlier section, trucks not for-hire accounted for a considerable proportion of the total truck movement of both dried rough and milled rice. No charges are made, of course, because such carriers haul rice owned by the firm which operates the trucks.

There are several important structural differences between truck and rail rates. One is that truck rates do not provide for transit privileges. The charges from the detached driers to the consuming centers are the sums of the rates from the driers to the mills and the rates from the mills to consuming centers.

Another important difference is in the minimum weights for rail carload and truckload lots. Rail carload minima are generally between 30 and 40 tons, with some as low as 15 and some as high as 50 tons. Truck minima are generally lower--typically 15 or 20 tons, with a number of rates based on 10 tons.

Still another difference is that there is much less blanketing of truck rates. Truck rates on rice vary much more in accordance with mileage than rail rates. However, because various sources have been relied upon for truck rates, the pattern shown is quite irregular at some points.

Water Rates

Both port-to-port and rail-water rates (via the Gulf of Mexico and Atlantic Ocean) are characterized by wide blanketing of destination points. The port-to-port rate on milled rice from any given one of the principal Gulf ports, or the rail-water rate from any given interior milling point in the South, is identical to the various North Atlantic ports, including Baltimore, Philadelphia, New York City, nearby Edgewater, N. J., and Boston (table 19, Appendix II).

But there is substantial variation among the Southern ports in rates to the North Atlantic ports. The actual port-to-port rates (excluding port charges and marine insurance) is 92 cents per 100 pounds for New Orleans and nearby Belle Chasse, La., substantially lower than the 103.5-cent rate from Houston and neighboring Texas City, which are more distant. Port charges (for wharfage and loading) are 7.3 cents per 100 pounds at all of these ports, except at New Orleans, where they are 5.6 cents. This makes the total port-to-port rate (excluding marine insurance) from New Orleans 97.6 cents per 100 pounds, from Belle Chasse 99.3 cents, and from Houston and Texas City 110.8 cents. Marine insurance has been estimated at about 1 cent per 100 pounds for each of these movements.

Rail-water rates are blanketed as to both origin and destination points. The rates to North Atlantic ports are the same from all Texas mill points, from all Louisiana mill points, and from all Arkansas mill points. In fact, the rate from mill points in Texas and in Louisiana is the same, 112.5 cents per 100 pounds, but the rate from those in Arkansas is substantially higher--129 cents. This is the total charge, excluding marine insurance, as the port charges are absorbed by steamship companies.

Comparisons Among Rail, Truck, and Water Rates

Railroad rates are lower than truck rates (obtained as indicated above) from important drying and milling points in the South to principal markets in the North, Southeast, and Far West (table 18, Appendix II). Generally, the shorter the haul, the closer together the railroad and truck rates are, and vice versa. For example, on rice dried at Tuckerman,

Ark., and milled at Jonesboro, Ark., the rail rate to Chicago (a total distance of about 550 miles) is only 6 cents below the truck rate. From the same origin points to New York City, almost 1,200 miles apart, the rail rate is 29 cents less, and from these origin points to San Francisco, about 2,250 miles away, the difference is $3.54 per 100 pounds.

Table 7 compares motor, rail, and water (or rail-water) rates from important milling centers in the South to New York City, the principal Atlantic port receiving rice. Water (or rail-water) rates are the lowest and motor rates are the highest. Shipment by water has less advantage when the origin is an interior mill point such as Stuttgart, Ark., than when the origin is a port, because the distance by rail and water is much greater than by inland methods of transport and because of the necessity of using the railroad for part of the movement--a higher-cost mode of transport than water.

Several points should be considered in connection with the foregoing comparisons. One is that these comparisons are from milling centers. The movement from detached driers to mills is excluded. If the movement from driers were included, the all-rail movement would have available transit privileges. No such advantage is applicable on water or motor movements.

Another point is that the movements described in table 7 have an Atlantic port as the destination. To interior points in the Northeastern States, rail-water movement would have less, if any, advantage over rail or truck shipment, because of the much longer hauls in comparison with overland routes and because an additional inland haul would be necessary.

TABLE 7.--Comparative truck, rail, and water rates, in cents per 100 pounds, on milled rice from selected Southern points to New York, N. Y.

Origin	Truck	All rail	Water or rail-water[1]
Crowley, La.	209.0	148.5	112.5
New Orleans, La.	135.0	131.0	97.6
Houston, Tex.	223.0	150.5	110.8
Stuttgart, Ark.	167.0	134.5	129.0

[1] Includes all port charges. From Crowley and Stuttgart, the movement is by rail-water. From New Orleans and Houston, it is by water.

Above rates selected from tables 18 and 19, Appendix II.

Profitability of Railroad Rates on Rice

Although the current railroad rates are generally lower than truck rates, they are apparently very profitable to the carriers. According to computations of the Interstate Commerce Commission's Bureau of Accounts and Cost Finding, the revenue received by the railroads from the carload movement of rice in 1952[16] was over 200 percent of out-of-pocket costs and 130 percent of fully distributed costs.[17]

These percentages exceed those for all commodities, as a whole, and exceed the percentages for each major commodity group except that, on the fully distributed basis, there is a single group which shows a slightly higher percentage (table 8).

[16] This was the latest year for which data were available.

[17] Interstate Commerce Commission, Bureau of Accounts and Cost Finding, Distribution of the Rail Revenue Contribution by Commodity Groups, 1952. Statement No. 1-55, March 1955.

The extent to which revenue from the rail movement of rice exceeds costs is more impressive when the ICC Bureau's definitions of out-of-pocket and fully distributed costs are considered. Out-of-pocket costs are defined as "those expenses which, over the long-term period, are variable with the volume of traffic handled."[18] They include 80 percent of the operating expenses plus an allowance for return at 4 percent on 50 percent of the road property and 100 percent of the equipment. Fully distributed costs are the sum of out-of-pocket costs (as thus defined) and the "apportioned overhead burden." The latter term includes "the remaining operating expenses, rents, and taxes, and allowance for return not included in the out-of-pocket costs, the sum of which was distributed among the commodities on a ton and ton-mile basis. In addition, the total overhead burden thus indicated also included any deficits incurred in the passenger-train and less-carload services, and the allowance for return was adjusted to reflect the actual rate of return earned by the carriers in 1952." These rates of return on investment ranged from 3.4 percent for the Eastern district to 6.7 percent for the Pocahontas region.

TABLE 8.--Comparisons of revenue with out-of-pocket and fully distributed costs, railroad carload freight, 1952

Commodity or commodity group	Percentage relationship of revenue to	
	Out-of-pocket cost	Fully distributed cost
	Percent	*Percent*
Rice	204	130
All products of agriculture	137	96
All animals and products	121	100
All products of mines	125	75
All products of forests	132	86
All manufactures and miscellaneous	185	132
All forwarder traffic	156	129
All commodities	152	102

Interstate Commerce Commission, Bureau of Accounts and Cost Finding, Distribution of the Rail Revenue Contribution by Commodity Groups, 1952, Statement No. 1-55.

DISTANCES OF RICE MOVEMENTS

Dried Rough Rice

For dried rough rice, length of haul was measured in this survey from the same two standpoints as other factors: (1) As shipments by detached driers and warehouses, and (2) as receipts by mills. The two sets of data tend to corroborate each other. When all the Southern States are considered together, the two sets of figures are quite similar, as is shown by table 9. This is especially true if consideration is given to the differences between shipments by detached driers and warehouses and mill receipts, discussed in a foregoing section.

Table 9 shows that about half of the total railroad volume of dried rough rice in the Southern States as a group moved less than 50 miles, and about half 50 miles and over. Approximately 5 percent moved 300-499 miles, and 1 percent or less, 500 miles or over.

[18] Ibid, p. 1.

The movements by truck were for much shorter distances. Of the total such movements in the Southern States as a group, about 95 percent were for less than 50 miles, and the remainder 50-299 miles.

There were substantial differences among the several Southern States (tables 20 and 21, Appendix II). The longest hauls from detached driers and warehouses were from those in Arkansas. But the longest hauls of mill receipts were reported by mills in Louisiana.

This difference seems to be explained largely by interstate movements of dried rough rice. Practically all of the mill receipts of rice in Arkansas originated in that State, while Louisiana receives a considerable amount of rice for milling from other States.

TABLE 9.--Distribution of shipments of rice according to distance, all Southern States, 1953-54 season

Type of rice and mode of transportation	Percentage of total volume for which distance was reported				
	Less than 50 miles	50-299 miles	300-499 miles	500 miles or over	Total
Dried rough rice					
Shipments by detached driers and warehouses	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Rail	51	42	6	1	100
Truck	97	3	0	0	100
Receipt by mills					
Rail	43	52	4	([1])	100
Truck	95	5	0	0	100
Milled rice shipped by mills					
Rail	26	13	15	46	100
Truck	34	40	13	13	100
Rail-water	0	0	8	92	100

[1] Less than 0.5 of 1 percent.

Milled Rice

The length of haul of shipments of milled rice was considerably longer than for dried rough rice. Of the total volume of rail shipments by the mills in all of the Southern States for which information was obtained, almost half was shipped 500 miles or over. The corresponding figure for truck shipments was 13 percent and for rail-water movements over 90 percent.[19]

Of the total volume of rail shipments, about one-fourth was in the less-than-50-mile group. These shipments consist primarily of switching movements to docks for export. Such movements were especially important for mills in port cities in Texas and Louisiana (table 22, Appendix II).

[19] These figures refer to domestic movements only. Thus, the rail-water figure does not include export movements, but pertains only to those shipments with domestic destinations.

CONTAINERS USED FOR SHIPPING RICE

Dried Rough Rice Shipped by Detached Driers and Warehouses

Of the total volume of dried rough rice shipped by detached driers and warehouses in the Southern States (for which reports as to type of container were received), 80 percent was shipped in bulk and 20 percent in bags (table 23, Appendix II).[20]

Some substantial differences existed among the States. Of the total volume for which reports were received as to type of container, 100 percent of the shipments by detached driers and warehouses in Arkansas was in bulk. The percentages in bulk were over 85 percent for Louisiana and over 70 percent for Texas.

Dried Rough Rice Received by Mills

The preponderance of movements in bulk indicated above was corroborated by analysis of receipts by mills. However, the latter figures indicate a larger percentage of movement in bulk than is indicated by shipments by detached driers and warehouses. Of the total receipts of dried rough rice reported by mills in all the Southern States, over 95 percent was in bulk. There was relatively little variation among States. For Arkansas, the figure was 100 percent, and for both Louisiana and Texas, about 95 percent.

The great preponderance of movement in bulk seems to conflict somewhat with the relative capacity of bulk storage as compared with bag storage. In 1951, of the total commercial dried rough rice storage capacity in Arkansas, Louisiana, and Texas, 55 percent was bulk storage. The percentage for Louisiana was 27 percent, for Texas 50 percent, and for Arkansas 95 percent.[21] Although no data are available on storage space in the 1953-54 season, there is evidence that bulk storage then was more important percentagewise than in 1951. By 1955, it is estimated that bulk storage formed over half of the total commercial dried rough rice storage capacity in Louisiana and about 65 percent of that in Texas.[22]

A possible explanation of the difference between the data on movements and on storage capacity is the fact that in recent marketing seasons, through the 1953-54 season, a large proportion of the total crop has been transported directly from detached driers to mills without entering into extended storage.[23] This has taken place primarily because of the large export demand. In the 1954-55 season, by contrast, because of a large crop in the face of a reduced export market, a much larger proportion of dried rough rice entered into extended storage, much of it probably being in bags.[24]

Shipments of Milled Rice

Of the total volume of milled rice shipped by mills in all the Southern States (for which types of containers were reported),[25] 75 percent was shipped in 100 pound bags. Consumer packages of less than 5 pounds accounted for almost 15 percent of the shipments, bags of 5 pounds and over but less than 100 pounds for almost 5 percent, and other types of containers (including bulk shipments) over 5 percent. Export shipments were generally made in 100-pound bags (table 24, Appendix II).

Texas led in the proportion of total shipments in consumer packages of less than 5 pounds, with over 25 percent. Arkansas was second, with over 15 percent, and Louisiana third, with 5 percent.

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[20] Reports as to type of container were not received for 5 percent of the shipments.

[21] Efferson, J. Norman, Hathorn R., and Gerlow, A., op. cit., p. 5. These figures were based on reports from the various State offices of the former Production and Marketing Administration of the U. S. Department of Agriculture.

[22] Estimate based on data in J. E. Jay and M. R. Enger, Railroad Transportation of Rough Rice in Louisiana and Texas: A Study of Facilities and Equipment. U. S. Dept. Agr. Mktg. Res. Rept. No. 136, September 1956.

[23] Efferson, J. Norman, Hathorn, R., and Gerlow, A., op. cit., p. 4.

[24] See Jay and Enger, op. cit.

[25] Reports as to type of container were not received for 5 percent of the total volume of shipments of milled rice.

POWER-DRIVEN EQUIPMENT OPERATED FOR LOADING OR UNLOADING

Most of the rice mills and detached driers and warehouses in the Southern States operated some type of power-driven equipment for loading or unloading freight cars or trucks (table 25, Appendix II). Of the total of 317 such establishments, it was estimated that 277 (or 87 percent) operated some such equipment. Only 39 establishments did not operate such equipment. The operator of one establishment did not answer this question.[26]

The equipment can be divided into three groups, one consisting of loading equipment, another of unloading equipment, and a third of equipment usable for either loading or unloading.

The most common type of loading equipment operated was the gravity spout system, for loading rice in bulk. The gravity spout system typically includes one or more power-driven elevators which place the rice in bulk at a level from which gravity can do the loading. Over 230 such systems, some of which were "swivel loaders," were operated by an estimated 157 establishments, or practically half of the total number. As was to be expected, the gravity spout system was much more common at detached driers and warehouses than among mills, because comparatively little milled rice is shipped in bulk. However, mills frequently make bulk shipments of brewers' rice--a form of milled rice.

Another type of equipment for loading bulk rice, the blower system, was used by 21 establishments. All of these were detached driers and warehouses.

The most common type of power-driven equipment used only for unloading was the mechanical hoist for tilting trucks to allow the bulk rice to run out into a receiving pit or hopper. Of the total number of establishments, an estimated 209 (or about 65 percent) operated 275 such hoists.

Other types of unloading equipment, also used only for rice in bulk, included the power shovel and the suction system.

Several types of equipment were usable for either loading or unloading. The belt conveyor is used for moving rough or milled rice, either in bulk or in bags or other containers. Over 190 conveyors were operated by 115 establishments, or about one-third of the total number. The forklift truck also is used for moving either rough or milled rice but is limited to handling rice in bags or other containers. Fifteen establishments operated 45 such trucks.

SUGGESTIONS FOR IMPROVING LOADING OR UNLOADING METHODS

Use of Paper Grain Doors

The operators of only 23 of the total of 105 mills, driers, and warehouses in the sample made suggestions for improving loading or unloading methods.[27] The most common suggestion, advanced by operators of 8 establishments, was for the use of paper grain doors on boxcars. These were declared superior to wooden doors.[28] It was frequently declared that paper doors were much more convenient. Holes could be cut in paper doors, letting bulk rice run out. Wooden doors, it was said, have to be pried loose (carefully, so as not

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[26] The foregoing figures do not include data for screw conveyors (operated by 55 establishments) because such equipment is not directly involved in moving rice into or out of freight cars or trucks. The screw conveyor, when used in connection with unloading, moves rice from a receiving pit or hopper into the mill, drier, or warehouse.

[27] The figures in this section have not been expanded; they are the actual number of establishments in the sample.

[28] On the other hand, the operator of one establishment stated a preference for wooden grain doors. Another indicated a desire for "better grain doors" without describing the type, if any, contemplated.

The operator of one mill stated that most damage to packaged rice occurred at the doors of the boxcars. Loads tended to shift against the doors, which, when opened, jammed the packages. This operator obtained good results by using retaining metal strips, which are nailed inside and hold the cargo away from the outside door.

to damage them) and stored for account of the railroad. Some wooden doors were received in poor condition. Several operators declared that there was less leakage through paper grain doors than through wooden doors.

On the other hand, one mill operator stated that paper doors were more convenient, but not as strong.

Better Boxcars

Operators of 7 establishments stated that better boxcars would improve loading or unloading. It was stated that, before loading, cars have to be inspected carefully for nails and leaks. Criticism was made also of the opening and closing apparatus of car doors.

The management of one plant suggested that steel boxcars were better than wooden cars.

Other Suggestions

Other suggestions include the following:

Movable belt conveyors are useful.

Better means to protect packaged rice should be developed.

Railroad weighing stations should be closer to the shippers.

A combination scale and dump should be used.

Dump trucks are safer than hoists, from which trucks may slip and drop to the ground.

ATTITUDES OF RICE MILLERS TOWARD USING COVERED HOPPER RAILROAD CARS

Operators of about half the rice mills in the sample surveyed expressed themselves as in favor of using covered hopper railroad cars for incoming shipments of dried rough rice, and those of 40 percent were opposed. The management of almost 10 percent of the mills expressed no opinion on this subject.[29]

By States, the greatest support for using covered hopper rail cars was from mills in Arkansas. Operators of three-fourths of these mills were in favor, with those of only one-eighth opposed and the management of one-eighth expressing no opinion. Among the Louisiana mills, the operators of 50 percent were in favor, 40 percent were opposed, and 10 percent expressed no opinion. Texas was the only State in which the operators of the majority of the mills (75 percent) were opposed, with the management of only 25 percent favoring covered hopper rail cars (table 26, Appendix II).

Reasons for Favoring Hopper Cars

The chief reason advanced by mill operators in favor of covered hopper rail cars was lower cost, because of such factors as the need for less labor, greater speed in loading or unloading, and the absence of a need for grain doors.

Only a few mills received their dried rough rice in hopper cars. Operators of all of these mills were pleased with the results. The outstanding example was two cooperative mills (operated jointly) with which detached driers and warehouses are affiliated. All these facilities were operated as a coordinated enterprise. The hoppers were kept shuttling among the cooperative's detached driers and warehouses and its mills during a

[29] The figures in this section have not been expanded. They are the actual number of establishments in the sample.

good part of the year. This usage removed a serious objection of railroads to hoppers, i. e., under-utilization of cars during the off season.

Operators of several mills mentioned the desirability of using covered hoppers for outgoing shipments of brewers' rice, because of greater cleanliness and other factors.[30]

Reasons for Opposing Hopper Cars

The principal objection to using covered hopper rail cars was the high cost believed necessary to construct facilities for unloading (particularly pits and covers over tracks). It was stated that some of the incoming shipments would arrive in boxcars, making it necessary to have facilities available to handle both types of receipts. Some stated that the volume of receipts was not large enough to warrant the cost of such facilities.

Several reasons were advanced for the necessity to maintain facilities for unloading boxcars in addition to the facilities for hopper cars. One reason was the probable inability or unwillingness of the railroads to furnish an adequate supply of hopper cars. (Hopper cars are of more limited use than boxcars; hence, the carriers might be reluctant to construct a sufficient number of them to handle the peak load during the rice season.) Another reason is that, in certain areas, particularly Louisiana and Texas, some rice is stored and shipped in bags.

Some mill operators indicated that they were happy with their present facilities. Others based their opposition to hopper cars on the lack of familiarity with operation of the cars. Such lack of familiarity was the principal reason why some mill operators did not express an opinion on this subject.

One mill received only green rice, which almost invariably comes in by truck. Some operators indicated that the boxcars in which dried rough rice was received were frequently used to ship out milled rice; hopper cars could not be used for such outbound movements.

CLEANING AND RECOOPERING OF RAILROAD BOXCARS BY RICE SHIPPERS

Cleaning

Of the mills and detached driers and warehouses in the Southern States making rail shipments, operators of almost half reported that they cleaned (beyond a nominal extent) some boxcars for outgoing shipments (table 27, Appendix II). This figure and other statistics of the extent (as well as cost) of cleaning understate the amount of cleaning necessary. The reason is that shippers generally rejected the cars in really bad condition. These cars had to be cleaned by the carriers. However, shippers do not escape all direct costs even in such cases, because of the consequent delays in loading operations.

The establishments which cleaned cars, cleaned an average of over 60 percent of the boxcars they loaded.[31] Variations existed among the several States in the average percent of total cars cleaned.

The average cost of cleaning railroad boxcars by mills and detached driers and warehouses was almost 80 cents per car for those cars used for bulk rice.[32] The comparable average cost of cleaning cars used for rice in bags or containers was over 90 cents per car.

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[30] A number of operators of detached warehouses and driers favored hopper cars for loading dried rough rice because of less costly loading. Among the reasons advanced were less labor requirements and no need for grain doors.

[31] Each "average" in this analysis of cleaning and recoopering is the median. The median is the figure which is exceeded by those of half of the establishments, and which, in turn, exceeds the figures of the other half of the establishments. This means that about half of the establishments that cleaned cars, cleaned more than 60 percent of the boxcars they loaded, and about half cleaned fewer than 60 percent.

[32] This is the average cost per car actually cleaned. In the computation of this average, no consideration was given to the large number of cars which were not cleaned at all.

Recoopering

Of the mills and detached driers and warehouses in the Southern States making rail shipments, operators of over one-sixth reported that they recoopered some boxcars for outgoing shipments. This means repairs to the body of the car. Only recoopering beyond a nominal extent was considered (table 28, Appendix II). As in the case of dirty cars, shippers generally reject the cars in worst condition. Recoopering of rejected cars by the carriers themselves is not covered by this survey. Hence, the statistics obtained do not show the full extent of defectiveness of the cars which the carriers offer to the shippers.

The establishments which recoopered some cars recoopered an average of almost 10 percent of the boxcars they loaded.

The average cost of recoopering railroad boxcars by mills, driers, and warehouses was almost $1.75 per car recoopered for those cars used for bulk rice. The comparable average cost of recoopering cars used for rice in bags or containers was about $1.15 per car.

As was to be expected, the average cost of recoopering was higher than that of cleaning. It is interesting to note that the average cost of recoopering cars used for bulk rice was higher than the average for cars used for bags or containers. The opposite relationship was true with respect to the cost of cleaning cars.

MOTOR VEHICLES OPERATED BY MILLS, DRIERS, AND WAREHOUSES

An estimated 53 mills and detached driers and warehouses, one-sixth of the total number in the South, operated motor vehicles in over-the-road service (table 29, Appendix II). No vehicles were used in such service by 248 establishments, and 16 did not answer this question. The proportion of mills operating motor vehicles (almost 30 percent) was much larger than the proportion of detached driers and warehouses (13 percent).

The number of vehicles operated was estimated as 137, of which 87 were straight trucks and 50 were tractor-semitrailer combinations.

THE PATTERN OF RICE MOVEMENTS

Movements by Rail

The waybill statistics compiled by the Interstate Commerce Commission provide data on the State-to-State movement of rice by railroad since 1948 (table 30, Appendix II). A reasonably accurate picture of such movements is presented, if the limitations of the data are kept in mind.

This section is confined to the analysis of movements between States which grow or mill rice, and other States. The reason for this is the large amount of multiple counting of movements within the rice-growing and -milling States. Tonnage in such States is counted several times--every time it is shipped by rail as rough rice under transit arrangements, and again when it is shipped as milled rice, whether or not under transit arrangements.

Another limitation of the waybill statistics is that they are based on a sample, and, consequently, are subject to a certain amount of sampling error. The sample is 1 percent of terminated waybills. The greater the absolute figures, the less the percentage of

sampling error.[33] In order to arrive at figures with far smaller sampling errors than would obtain for individual years, totals for the 6-year period 1948-53, inclusive, are shown--the only years for which the waybill statistics were available. With this grouping of the data for 6 years, the picture is reasonably accurate.

Of the regions in which no rice production or milling of consequence takes place, the East North Central region (consisting of Ohio, Indiana, Illinois, Michigan, and Wisconsin) had the largest volume of rail receipts of rice. Of the total rail receipts in that region (probably consisting almost exclusively of milled rice for table use and for manufacturing cereals and beer), 75 percent originated in the Southern rice States in the 1948-53 period. Most of the remainder came from California. Of the total rice receipts in the East North Central region, Louisiana accounted for 31 percent, Arkansas for 27 percent, and Texas for 17 percent. Any rice shipments from Mississippi or Tennessee to this region did not appear in the waybill statistics and were probably small.

Practically all of the rail receipts of rice by the Southern States (other than those of the rice-producing and -milling States) came from the Southern producing States studied here. In the 1948-53 period, 56 percent came from Arkansas, 22 percent from Louisiana, and 21 percent from Texas.

Approximately half of the 1948-53 receipts in the North Atlantic region (consisting of New England, New York, New Jersey, and Pennsylvania) came from the Southern rice region. California furnished 10 percent of the receipts. But what at first blush seemed anomalous was the relatively large volume of receipts (37 percent of the total) from the same or other North Atlantic States, which do not grow or mill rice. One reason for this apparently was the volume of water-rail movements involving water movements from Gulf or Pacific ports to North Atlantic ports, followed by rail movements to other North Atlantic destinations.

Rail Carload Weights.--The average net weight of rice (both rough and milled) per rail car shipped from the Southern rice area was almost 41 tons in 1954.[34] This was almost 60 percent higher than the average in 1929 of 26 tons (table 32, Appendix II). After 1929, the average carload rose slowly but steadily to 31 tons in 1941. During 1942 and 1943, the figure increased sharply to almost 44 tons. Since 1943, the average carload has fluctuated somewhat, with a downward trend.

The lightest average carload weights were generally for shipments to the Southeastern States. These averaged 23 tons in 1953.[35] Carload weights as low as 16 tons were noted for a shipment (apparently of milled rice) to North Carolina. However, there was a carload to Alabama with a net weight of 50 tons. The heaviest carload weights, averaging 48 tons, were of shipments to the States corresponding in general to the West North Central region.

The foregoing differences are apparently explained chiefly by differences in minimum carload weights in the tariffs. Carload rates from important Southern milling points to Charleston, S. C., and to Atlanta, Ga., are based on minima of 15 tons. The minimum to Tampa, Fla., was 20 tons.

The minima available to important markets in the North Central States were much higher: as high as 40 tons to Milwaukee, Wis., and Chicago, Ill., and 50 tons to Battle Creek, Mich.

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[33] According to the ICC, this sampling error "may be estimated by taking the reciprocal of the square root of the number of cars reported in any category or all of the sample. For example, estimates of total cars, tons, or revenue for a sample category containing 100 cars will usually be within 10 percent of the true figure, but if there are 400 cars, the difference will usually not exceed 5 percent." Statement No. 5430, p. ii. In order that it not be too complex, table 26 does not show the number of cars. The number of cars in any category can be estimated by dividing the number of tons by 41, the average tons per car in the 1948-53 period.

[34] This figure is based on all the movements, not a sample. It was obtained from the Freight Commodity Statistics of the Interstate Commerce Commission. The figure applies to the ICC's southwestern region, which comprises chiefly Louisiana, Arkansas, most of Texas and of Oklahoma, and a large part of Missouri. With respect to outbound rice shipments this area differs but slightly from what has been defined in this survey as the Southern rice area.

[35] These figures are based on the sample compiled by the ICC in Carload Waybill Analysis.

The only figures available on the weights of individual carloads cover all movements within the U. S., including shipments from California.[36] Of the total number of carloads (both rough and milled rice) terminated in the United States in 1953, 43 percent had a net weight of 50 tons or more. Because shipments from California were relatively heavy (averaging about 52 tons), their inclusion made this percentage higher than it would be for shipments from the Southern rice States alone. However, the elimination of California shipments still leaves 34 percent of the carloads weighing 50 tons and over.

Movements by Water

Exports.--For a number of years, a large part of the rice production in the United States (as much as half in the 1951-52 and 1952-53 seasons) has been exported. Except for a small volume of shipments by land to Canada and possibly to Mexico, exports move by water. Of the total volume of rice exports from U. S. ports since the 1951-52 season, over three-fourths has been shipped from Gulf Ports, and practically all of the remainder from California.

The principal rice port in the country for export shipments is Lake Charles, La., from which about 197,000 tons (of 2,000 pounds each) were exported in 1954. Lake Charles accounted for almost half of the total rice exports from Gulf ports in the 1951-54 period (table 31, Appendix II). Next in volume is Houston, Tex., from which about 147,000 tons were exported in 1954. Third among the Gulf ports is New Orleans, with a volume of approximately 58,000 tons in 1954. Among all U. S. ports, however, New Orleans was exceeded in volume of rice exports by Stockton, Calif., with about 101,000 tons, and by San Francisco, with almost 59,000 tons in 1954.

Domestic Oceanborne Movements.--As indicated in an earlier section of this report, rail-water shipments to domestic destinations amounted to only about 4 percent of the total volume of shipments of milled rice from the Southern States. In 1954, about 147,000 tons of rice were shipped from Gulf ports to domestic destinations, substantially more than the 109,000 tons shipped in 1951. This figure includes shipments both to destinations in the continental U. S. and to U. S. territories and possessions, notably Hawaii and Puerto Rico.

The largest volume of coastwise or intercoastal shipments from any U. S. port was from Texas City, Tex., with almost 58,000 tons in 1954. Next in volume was Lake Charles, with almost 44,000 tons, followed by New Orleans with about 40,000 tons.

The point in the continental U. S. with the largest volume of coastwise or intercoastal receipts is the Port of New York, with about 84,000 tons in 1954. This represents a substantial increase above the approximately 60,000 tons in 1951. Philadelphia is a far lower second, with about 2,500 tons in 1954.

Inland Waterway Movements.--The volume of domestic movement of rice between or from the Southern States by inland waterways is very small. In 1954, such shipments up the Mississippi River amounted to about 1,550 tons, of which about 1,350 consisted of shipments from Memphis to St. Louis. The total downbound domestic movement on the Mississippi River was almost 3,100 tons, of which about 2,300 were shipped from Memphis to New Orleans.

CONCLUSIONS

Although railroads have a smaller proportion of the rice traffic than they did in the late 1920's and during World War II, they still haul the preponderant part of both the dried rough and the milled rice shipped within and from the Southern States. The chief reason for this rail dominance apparently is their lower rates in comparison with trucks. Although these lower rates were chiefly attributable to transit privileges, railroad rates were frequently less than truck rates in other situations as well.

[36] See footnote 35.

Other reasons why the rice trade prefers railroads to trucks are that railroads have advantages in loading and unloading (especially on the ground that railroads are better adapted to large-volume movements), that available facilities are set up for rail movement, and that railroads generally have a more dependable supply of equipment.

However, trucks are much more important than they were 25 years ago. Among the reasons for this greater importance advanced by rice shippers and receivers are that trucks offer faster, more flexible, and more convenient service, and that they have lower minimum weights.

This survey indicates that lower rates and superior service can retain traffic on the rails except where the railroads are at a marked disadvantage, as in the case of short hauls and light loads. Even on some very short hauls (such as switching movements to docks), railroads have often been preferred because of lower rates and better loading facilities.

The advantages of a given mode of transport as shown in this study are not all of an inherent sort. To the extent that they are not inherent, a rival mode of transport might well seek to improve its competitive position by adopting the feature of service or rates which shippers and receivers view with favor. The same thing might be done by the same mode of transport in another region. Thus, in this study, many shippers said that railroads are superior to trucks in providing cars for loading at the promised time. On the other hand, in a study of the transportation of Appalachian apples,[37] shippers praised the truckers for providing vehicles at the promised time and complained that railroad cars sometimes were spotted 24 to 48 hours after the promised date. This is only one factor which helps to account for the dominance of trucks in the hauling of Appalachian apples and of railroads in the movement of Southern rice; but it is a factor worth the attention of railroads and truck lines alike.

Only a few establishments covered in the survey used covered hopper rail cars for the movement of dried rough rice. However, half of the mills indicated that they would favor the use of such cars for inbound shipments. Several mill operators stated that they prefer to ship brewers' rice in such cars, and operators of some detached driers and warehouses stated that they would favor such cars for shipping out dried rough rice. The chief reason advanced in favor of covered hoppers was cheaper and faster unloading. Among the reasons advanced in opposition to the use of such cars was the high cost believed necessary to construct facilities to handle such cars. Other reasons were the probable inability or unwillingness of the railroads to furnish an adequate supply of cars of that type and the large volume of rice in bags usually handled. A number of mill operators based their opposition upon lack of familiarity with the utilization of hopper cars.

If the obstacles mentioned can be removed, or at least reduced, it appears that expanded use of covered hopper rail cars offers a real possibility of effecting an important reduction in costs and time of unloading operations. Loading operations might also be benefited, but apparently to a lesser extent. The problem of covered hopper rail cars is now being studied by the Department of Agriculture with the objective of determining whether their utilization in the transport of rice can be expanded. A separate report[38] on that subject is in press.

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[37] Snitzler, James R., "Transportation of Apples in the Appalachian Belt, 1952-53," pp. 22-23, Agr. Mktg. Serv., August 1954.
[38] Jay and Enger, op. cit.

APPENDIX I: SAMPLING PROBLEMS

Of the 105 establishments for which reports were obtained in the field interviews, 41 were mills, comprising 60 percent of the total number of rice mills in the South. The mills in the sample accounted for 80 percent of the total rice receipts by Southern mills. Reports were also obtained from 64 detached warehouses and driers, accounting for 26 percent of the total number in the South (table 10). Although the percentage of total detached warehouses and driers included in the sample is smaller than for mills, the actual number is higher. The sample numbers of mills and of detached warehouses and driers were chosen so that both types of establishments would be adequately represented. In obtaining such samples, both the actual number and the percentage that the samples are of the universe (the whole Southern rice industry) are of importance. The percentage of the universe is especially important where the universe is relatively small, as is true of mills.

As noted earlier, the 105 establishments in the sample included 15 operated by cooperatives. These comprised 5 mills, of the total of 41 in the sample, and 10 detached driers and warehouses, of the total of 64 in the sample.

Methods of Expanding the Sample

As indicated in the body of this report, the statistics based on the questionnaires were expanded to represent estimates of the universe. Two methods of expansion were used. One method, used to develop tables based on number of mills or of detached driers and warehouses, was to expand each establishment by the inverse of its sampling rate. Thus, the number of establishments selected by a sampling rate of 33-1/3 percent was multiplied by 3, the number of those selected by a sampling rate of 25 percent was multiplied by 4, and so on.

Another method of expansion was applied to the statistics based on volume of shipments on the basis of receipts of mills.[39] The factors used were the percentages that the receipts of the mills in various sampling groups were of the universe in each sampling group. For example, two mills in Louisiana were selected on the basis of a sampling rate of 33-1/3 percent. The receipts of these mills were 31.98 percent of the receipts of the mills from which they were sampled. The expansion factors used were the inverse of this percentage (31.98); viz., 3.1267. All the volume figures of these mills (shipments and receipts by mode of transport, by type of container, etc.) were multiplied by 3.1267. Expansion factors were developed in a similar fashion for other sampling groups.

It would have been desirable to expand the volume statistics of detached driers and warehouses in the same way as for mills. However, no data as to receipts existed for the universe of detached driers and warehouses. Nor were there any other adequate data reflecting the volume of operations of these establishments. In lieu of any better figures, it was decided to utilize here, also, the expansion factors developed for numbers of detached driers and warehouses.

Sampling Errors of Statistics

Any statistics gathered from less than a complete count are subject to sampling variability. Other samples would probably yield somewhat different results.

Table 11, in this appendix, contains estimates of standard errors for a few of the statistics developed in the survey. (It was considered too laborious to compute the sampling errors for all the data presented in the survey.) The standard error (together with the sample figure to which it applies) indicates an interval within which it is estimated that the figure which would be obtained by a complete count would be found 2 chances out of 3. For example, according to our sample, of all the dried rough rice shipped by detached driers and warehouses in all the Southern States, 68.6 percent was shipped by railroad. The standard error of this figure is 3.5. This means that the chances are 2 out of 3 that the percentage which would be obtained by a complete count of Arkansas mills would differ from 68.6 percent by not more than 3.5 percentage points--i. e., would be somewhere between 65.1 and 72.1 percent.

[39] The data as to receipts were obtained from the Agricultural Estimates Division of the Agricultural Marketing Service.

TABLE 10.--Comparison of rice mills and detached driers and warehouses in sample with totals in Southern States

State and type of establishment	Localities in which establishments are situated[1]			Establishments			Receipts of rice by mills, 1953-54 season[2]		
	Total[3]	Sample	Sample as Percentage of total	Total[3]	Sample	Sample as Percentage of total	Total	Sample	Sample as Percentage of total
	Number	*Number*	*Percent*	*Number*	*Number*	*Percent*	*Million pounds*	*Million pounds*	*Percent*
Arkansas:[4]									
Mills.....	10	6	60	16	11	69	982	863	88
Detached driers and warehouses.....	32	11	34	40	13	33	--	--	--
Total.....	40	14	35	56	24	43	--	--	--
Louisiana:									
Mills.....	16	10	63	40	21	53	1,491	1,055	71
Detached driers and warehouses.....	45	12	27	120	27	23	--	--	--
Total.....	48	17	35	160	48	30	--	--	--
Texas:									
Mills.....	5	3	60	12	9	75	1,080	937	87
Detached driers and warehouses.....	43	13	30	89	24	27	--	--	--
Total.....	44	13	30	101	33	33	--	--	--
Southern States:									
Mills.....	31	19	61	68	41	60	3,553	2,854	80
Detached driers and warehouses.....	120	36	30	249	64	26	--	--	--
Total.....	132	44	33	317	105	33	--	--	--

[1] The total number of points in each State refers to those at which any mill, detached drier, or warehouse is located. Consequently, such totals can be (and here are) smaller than the sums of the number of points where mills are located plus the number where detached driers or warehouses are located.

[2] Totals and ratios computed before rounding of figures.

[3] The total number of mills was the total in actual operation during the year Aug. 1, 1953-July 31, 1954. The total number of detached driers and warehouses was the total listed by the Agricultural Estimates Division, Agricultural Marketing Service, as of Aug. 1, 1953. This was the latest list available at the time the sample was drawn.

[4] Includes Mississippi and Tennessee. For explanation of grouping, see footnote 1 on page 1 of text.

TABLE 11.--Estimates of sampling errors: Selected averages

State	Shipments of dried rough rice by railroad as percentage of total shipments from detached driers and warehouses		Shipments of dried rough rice in bulk as percentage of total shipments from detached driers and warehouses	
	Average	Standard error	Average	Standard error
	Percent	*Percent*	*Percent*	*Percent*
Arkansas[1].....	49.3	13.9	73.6	16.0
Louisiana.....	45.7	8.6	83.3	5.4
Texas.....	91.7	3.1	72.0	7.0
Southern States.....	68.6	3.5	76.6	3.8

[1] Includes Mississippi.

APPENDIX II: SUPPLEMENTARY TABLES

TABLE 12.--Modes of transportation used for the movement of rice in the Southern States, 1953-54

PERCENTAGE OF TOTAL VOLUME MOVED

Type of movement	Railroad	Truck	Rail-water	Other	Mode of trans-portation not reported	Total
Dried rough rice: Shipments by detached driers and warehouses	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Arkansas[1]	49	51	0	0	0	100
Louisiana	46	50	0	[2] 4	0	100
Texas	92	8	0	0	0	100
Southern States	69	30	0	[2] 1	0	100
Dried rough rice: Receipts by mills						
Arkansas[3]	62	38	0	0	0	100
Louisiana	69	31	0	0	0	100
Texas	98	2	0	0	0	100
Southern States	77	23	0	0	0	100
Milled rice: Shipments by mills						
Arkansas[3]	81	12	1	0	6	100
Louisiana	48	20	2	0	30	100
Texas	88	2	10	0	0	100
Southern States	71	13	4	0	12	100
PERCENTAGE OF VOLUME FOR WHICH MODE OF TRANSPORTATION WAS REPORTED						
Milled rice: Shipments by mills						
Arkansas[3]	86	13	1	0	--	100
Louisiana	69	28	3	0	--	100
Texas	88	2	10	0	--	100
Southern States	80	16	4	0	--	100

[1] Includes Mississippi.
[2] Conveyor belt to mill.
[3] Includes Tennessee.

TABLE 13.--Control over motortrucks used to ship dried rough rice from detached driers and warehouses in the Southern States, 1953-54 season

PERCENTAGE OF TOTAL VOLUME MOVED BY TRUCK

State of detached drier or warehouse	For hire	Private				Owned or hired by consignee mills[3]	Type of control not reported	Total
		Total	Owned by reporting drier or warehouse[1]	Owned by consignee mills	Owned by farmer[2]			
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Arkansas[4]	([5])	91	55	5	31	0	8	100
Louisiana	44	48	5	25	18	5	3	100
Texas	1	59	8	0	51	3	37	100
Southern States	29	58	16	18	24	4	9	100
PERCENTAGE OF TRUCK VOLUME FOR WHICH TYPE OF TRUCK WAS REPORTED								
Arkansas[4]	([5])	[6] 100	60	6	34	0	---	100
Louisiana	45	49	5	26	18	6	---	100
Texas	2	93	12	0	81	5	---	100
Southern States	32	64	17	20	27	4	---	100

[1] This movement was chiefly by detached driers and warehouses which were owned by mills or operated by the same management.

[2] Generally holding title to the rice. Does not include trucks owned by cooperatives operating mills or detached driers or warehouses. Trucks owned by such cooperatives are regarded as owned by mills, etc., rather than by farmers.

[3] Further information as to type of control not available.

[4] Includes Mississippi.

[5] Less than 0.5 of 1 percent.

[6] Between 99.5 and 99.9 percent.

TABLE 14.--Control over motortrucks in which mills received dried rough rice in the Southern States, 1953-54 season

PERCENTAGE OF TOTAL VOLUME MOVED BY TRUCK

State of mill	For hire	Private			Type of control not reported	Total
		Total	Owned by reporting mill	Owned by farmer[1]		
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Arkansas[2].....	7	93	30	63	0	100
Louisiana.....	33	67	22	45	([3])	100
Texas.....	35	65	57	8	0	100
Southern States.....	20	80	27	53	([3])	100

[1] See footnote 2, table 13.
[2] Includes Tennessee.
[3] Less than 0.5 of 1 percent.

TABLE 15.--Control over motortrucks used to ship milled rice from mills in the Southern States, 1953-54 season

PERCENTAGE OF TOTAL VOLUME MOVED BY TRUCK

State of mill	For hire	Private				Type of control not reported	Total
		Total	Owned by reporting mill	Owned by consignee	Owned by farmer[1]		
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Arkansas[2].....	91	9	6	0	3	0	100
Louisiana.....	27	39	34	5	0	34	100
Texas.....	36	55	7	48	0	9	100
Southern States..	47	30	24	5	1	23	100
PERCENTAGE OF TRUCK VOLUME FOR WHICH TYPE OF TRUCK WAS REPORTED							
Arkansas[2].....	91	9	6	0	3	---	100
Louisiana.....	41	59	52	7	0	---	100
Texas.....	39	61	8	53	0	---	100
Southern States..	61	39	32	6	1	---	100

[1] See footnote 2, table 13.
[2] Includes Tennessee.

TABLE 16.--Rice: Railroad tonnage compared with farm sales, United States, 1928-54

Year[1]	Farm sales (plus beginning stocks, minus ending stocks)[2]	Railroad originations Class I roads	Railroad originations as percentage of farm sales
	1,000 tons	*1,000 tons*	*Percent*
1928	888	1,068	120
1929	789	977	124
1930	905	894	99
1931	904	831	92
1932	841	602	72
1933	754	643	85
1934	785	539	69
1935	792	647	82
1936	920	622	68
1937	1,153	761	66
1938	1,052	819	78
1939	1,090	727	67
1940	1,252	864	69
1941	1,177	819	70
1942	1,265	1,065	84
1943	1,387	1,351	97
1944	1,505	1,302	87
1945	1,491	1,509	101
1946	1,597	1,382	87
1947	1,690	1,550	92
1948	1,761	1,480	84
1949	1,933	1,557	81
1950	1,819	1,495	82
1951	2,345	1,586	68
1952	2,362	2,106	89
1953	2,244	1,913	85
1954	2,257	1,768	78

[1] Calendar years for railroad tonnage; crop years (August 1-July 31) for farm sales. Each crop year is matched against the calendar year in which it began; e.g., the crop year beginning August 1, 1953, is matched against the calendar year 1953.
[2] These beginning and ending stocks are chiefly in country warehouses and at mills.

Railroad tonnage: Interstate Commerce Commission.
Farm Sales: U. S. Department of Agriculture, Crop Reporting Board.
Stocks for 1928-34 were estimated.
Ending stocks for 1954 crop year are preliminary.

TABLE 17.--Rail freight rates on rice per 100 pounds, from selected Southern drying and milling points to principal markets outside the Southern rice States, Jan. 1, 1955

Drying point	Milling point	Northern markets					Southeastern markets			Western market
		Chicago, Ill.	Milwaukee, Wis.	Battle Creek, Mich.	Cleveland, Ohio	New York, N. Y.	Charleston, S. C.	Atlanta, Ga.	Tampa, Fla.	San Francisco, Calif.
		Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Parkin, Ark.	Jonesboro, Ark.	71	80	92.5	113.5	142	94	94	102	126
Tuckerman, Ark. ..	Jonesboro, Ark.	71	80	92.5	113.5	142	94	94	102	126
Weiner, Ark.	Jonesboro, Ark.	69	78	90.5	111.5	140	92	92	100	124
North Little Rock, Ark.	Stuttgart, Ark.	69	78	90.5	111.5	140	92	92	100	124
McGehee, Ark.	Stuttgart, Ark.	71	80	92.5	113.5	142	94	94	102	126
Brinkley, Ark. ...	Stuttgart, Ark.	69	78	90.5	111.5	140	92	92	100	124
Greenville, Miss..	Stuttgart, Ark.	101	110	122	143	172	124	124	132	156
Kaplan, La.	Crowley, La.	90	100	112	129	154	97	97	103	129
Eunice, La.	Crowley, La.	90	100	112	129	154	97	97	103	134
Mermentau, La. ...	Crowley, La.	90	100	112	129	154	97	97	103	131
Eunice, La.	New Orleans, La.	90	100	112	129	154	97	97	103	150
Greenville, Miss..	New Orleans, La.	100	107	122	149	158	[1] 86	[1] 86	87	145
McGehee, Ark.	New Orleans, La.	117	124	139	170	158	117	117	124	162
Katy, Tex.	Houston, Tex.	90	100	112	129	156	118	118	---	134
Eagle Lake, Tex. .	Houston, Tex.	90	100	112	129	156	118	118	125	139
Dayton, Tex.	Houston, Tex.	90	100	112	129	156	109	109	116	134

[1] Includes a back-haul charge of 5 cents per 100 pounds.

Each of the rates shown covers two movements: (1) That of dried rough rice from drying point to milling point, followed by (2) a movement of milled rice to consuming markets. The rates are based on published tariffs. They are the lowest carload rates available, and reflect transit privileges and charges where applicable. Ex Parte 175 increases are included. The 3 percent Federal transportation tax is not included.

Among the rates on rice originating at drying points in Arkansas and milled in Arkansas mills, there are differences according to whether the movement is a single-line or a joint-line haul. For a single-line haul (one with both the drying and the milling point on the same railroad), the net local rate, after deducting the cutback, is 5.5 cents per 100 pounds for hauls of 135 miles or less. For a joint-line haul (one with the drying and the milling point on different railroads), the net local rate on such movements is 2 cents higher.

TABLE 18.--Comparison between rail and motortruck rates on rice, per 100 pounds, from selected Southern drying and milling points to principal markets outside the Southern rice States, Jan. 1, 1955

Drying Point	Milling point	Northern markets														
		Chicago, Ill.			Milwaukee, Wis.			Battle Creek, Mich.			Cleveland, Ohio			New York, N. Y.		
		Mileage	Rail rates	Truck rates	Mileage	Rail rates	Truck rates	Mileage	Rail rates	Truck rates	Mileage	Rail rates	Truck rates	Mileage	Rail rates	Truck rates
		Miles	*Cents*	*Cents*	*Miles*	*Cents*	*Cents*	*Miles*	*Cents*	*Cents*	*Miles*	*Cents*	*Cents*	*Miles*	*Cents*	*Cents*
Tuckerman, Ark.	Jonesboro, Ark.	553	71	77	674	80	92	725	92.5	113	770	113.5	120	1,186	142	171
Brinkley, Ark.	Stuttgart, Ark.	704	69	81	783	78	96	810	90.5	117	892	111.5	122	1,286	140	185
Mermentau, La.	Crowley, La.	1,022	90	145	1,101	100	151	1,128	112	173	1,210	129	137	1,527	154	216
Eunice, La.	New Orleans, La.	1,099	90	156	1,178	100	162	1,194	112	166	1,237	129	170	1,528	154	160
Dayton, Tex.	Houston, Tex.	1,143	90	101	1,216	100	NA	1,267	112	191	1,350	129	139	1,732	156	232
		Southeastern markets									Western markets					
		Atlanta, Ga.			Charleston, S.C.			Tampa, Fla.			San Francisco, Calif.					
Tuckerman, Ark.	Jonesboro, Ark.	512	94	100	829	94	99	914	102	143	2,249	126	480			
Brinkley, Ark.	Stuttgart, Ark.	547	92	104	864	92	103	918	100	149	2,126	124	484			
Mermentau, La.	Crowley, La.	690	97	117	938	97	140	832	103	136	2,173	131	291			
Eunice, La.	New Orleans, La.	682	97	118	915	97	143	809	103	138	2,443	150	309			
Dayton, Tex.	Houston, Tex.	895	109	136	1,143	109	156	1,037	116	152	2,005	134	293			

NA--Not available.

Each of the rates shown covers two movements: (1) That of dried rough rice from drying point to milling point, followed by (2) a movement of milled rice to consuming market.

Railroad rates from published tariffs. Truck rates from tariffs or contracts on file with the State regulatory commissions and the Interstate Commerce Commission. Mileage is in highway miles. Figures shown are the lowest carload or truckload rates available. Rail rates reflect transit privileges and charges where applicable, and include Ex Parte 175 increases. The 3 percent Federal transportation tax is not included in the rail or truck rates shown.

Among the rail rates on rice originating at drying points in Arkansas and milled in Arkansas mills, there are differences according to whether the movement is a single-line or a joint-line haul. For a single-line haul (one with both the drying and the milling point on the same railroad), the net local rate, after deducting the cutback, is 5.5 cents per 100 pounds for hauls of 135 miles or less. For a joint-line haul (one with the drying and the milling point on different railroads), the net local rate on such movements is 2 cents higher.

TABLE 19.--Port-to-port and rail-water rates, per 100 pounds, on milled rice from Arkansas, Louisiana, and Texas to eastern seaboard ports[1], Jan. 1, 1955

PORT-TO-PORT

Origin	Rate	Port charges[2]	Total
	Cents	*Cents*	*Cents*
New Orleans, La.	92.0	5.6	97.6
Belle Chasse, La.	92.0	7.3	99.3
Houston, Tex.	103.5	7.3	110.8
Texas City, Tex.	103.5	7.3	110.8
RAIL-WATER			
Arkansas mill points[3]	129.0	0	129.0
Louisiana mill points[3]	112.5	0	112.5
Texas mill points[4]	112.5	0	112.5

[1] The eastern seaboard ports are New York, N. Y., Philadelphia, Pa., Baltimore, Md., and Boston, Mass., on movements from Houston and New Orleans. The movements from Texas City (near Houston) and Belle Chasse (near New Orleans) are to Edgewater, N. J., which is on New York Harbor.

[2] Include wharfage and loading charges, at origin, but not marine insurance. Unloading charges at eastern seaboard ports are absorbed by steamship companies. Port charges at origin ports are absorbed by steamship companies on tonnage delivered by rail carriers. It is estimated that marine insurance amounts to 1 cent per 100 pounds.

[3] Through Belle Chasse, New Orleans, Houston, and Texas City. The rate from Memphis, Tenn., is 1 cent per 100 pounds higher than from Arkansas mill points.

[4] Through Houston and Texas City.

The steamship lines whose rates are shown are as follows: Pan-Atlantic (from New Orleans), Newtex (from Houston), and Seatrain (from Texas City and Belle Chasse). Minimum weight: 40,000 lbs.

TABLE 20.--Distance of movement: Shipments of dried rough rice by detached driers and warehouses, Southern States, 1953-54 season

PERCENTAGE OF VOLUME SHIPPED

Distance of movement	Arkansas[1]		Louisiana		Texas		Southern States	
	Rail-road	Truck	Rail-road	Truck	Rail-road	Truck	Rail-road	Truck
Miles	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Less than 50.....	6	48	24	78	46	68	37	70
50-299.....	44	7	12	([2])	36	5	30	2
300-499.....	43	0	0	0	([2])	0	4	0
500 & over.....	7	0	0	0	([2])	0	1	0
Distance not reported.....	0	45	64	22	18	27	28	28
Total.....	100	100	100	100	100	100	100	100

PERCENTAGE OF VOLUME SHIPPED FOR WHICH DISTANCE WAS REPORTED

Less than 50.....	6	88	66	[3] 100	56	92	51	97
50-299.....	44	12	34	([2])	43	8	42	3
300-499.....	43	0	0	0	([2])	0	6	0
500 & over.....	7	0	0	0	([2])	0	1	0
Total.....	100	100	100	100	100	100	100	100

[1] Includes Mississippi.
[2] Less than 0.5 of 1 percent.
[3] Between 99.5 and 100.0 percent.

TABLE 21.--Distance of movement: Receipts of dried rough rice by mills, Southern States, 1953-54 season

PERCENTAGE OF VOLUME RECEIVED

Distance of movement	Arkansas[1]		Louisiana		Texas		Southern States	
	Rail-road	Truck	Rail-road	Truck	Rail-road	Truck	Rail-road	Truck
Miles	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Less than 50.....	48	99	15	91	51	98	39	95
50-299.....	32	1	58	9	48	0	47	5
300-499.....	0	0	11	0	1	0	4	0
500 & over.....	0	0	1	0	([2])	0	([2])	0
Distance not reported.....	20	0	15	0	0	2	10	([2])
Total.....	100	100	100	100	100	100	100	100
PERCENTAGE OF VOLUME RECEIVED FOR WHICH DISTANCE WAS REPORTED								
Less than 50.....	60	99	17	91	51	100	43	95
50-299.....	40	1	69	9	48	0	52	5
300-499.....	0	0	13	0	1	0	4	0
500 & over.....	0	0	1	0	([2])	0	([2])	0
Total.....	100	100	100	100	100	100	100	100

[1] Includes Tennessee.
[2] Less than 0.5 of 1 percent.

TABLE 22.--Distance of movement: Domestic shipments of milled rice by mills, Southern States, 1953-54 season

PERCENTAGE OF VOLUME SHIPPED[1]

Distance of movement	Arkansas[2]			Louisiana			Texas			Southern States		
	Rail-road	Truck	Rail-water[3]	Rail-road	Truck	Rail-water[3]	Rail-road	Truck	Rail-water[3]	Rail-road	Truck	Rail-water[3]
Miles	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Less than 50.....	0	0	0	21	45	0	41	23	0	21	31	0
50-299.....	1	21	0	27	44	0	(4)	10	0	10	36	0
300-499.....	27	36	100	3	(4)	0	4	8	1	12	11	8
500 & over.....	50	23	0	37	6	80	25	27	97	37	12	84
Distance not reported..	22	20	0	12	5	20	30	32	2	20	10	8
Total.....	100	100	100	100	100	100	100	100	100	100	100	100

PERCENTAGE OF VOLUME SHIPPED FOR WHICH DISTANCE WAS REPORTED[1]

Less than 50.....	0	0	0	24	47	0	59	35	0	26	34	0
50-299.....	1	26	0	31	47	0	1	15	0	13	40	0
300-499.....	35	45	100	3	(4)	0	5	11	1	15	13	8
500 & over.....	64	29	0	42	6	100	35	39	99	46	13	92
Total.....	100	100	100	100	100	100	100	100	100	100	100	100

[1] For which mode of transportation was reported. No report as to mode of transport was obtained for 12 percent of the total shipments in all the Southern States combined.
[2] Includes Tennessee.
[3] Primarily water movements preceded by railroad switching movements.
[4] Less than 0.5 of 1 percent.

TABLE 23.--Types of containers used in the movement of dried rough rice, Southern States, 1953-54 season

PERCENTAGE OF TOTAL VOLUME

Type of movement of dried rough rice and State	Bags	Bulk	Other	Type of container not reported	Total
Shipments by detached driers and warehouses:	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Arkansas[1]	0	74	0	26	100
Louisiana	13	83	0	4	100
Texas	28	72	0	0	100
Southern States	19	76	0	5	100
Receipts by mills:					
Arkansas[2]	0	100	0	0	100
Louisiana	3	96	1	0	100
Texas	6	94	0	0	100
Southern States	3	96	1	0	100
PERCENTAGE OF VOLUME FOR WHICH TYPE OF CONTAINER WAS REPORTED					
Shipments by detached driers and warehouses:					
Arkansas[1]	0	100	0	--	100
Louisiana	14	86	0	--	100
Texas	28	72	0	--	100
Southern States	20	80	0	--	100

[1] Includes Mississippi.
[2] Includes Tennessee.

TABLE 24.--Types of containers used in shipments of milled rice by mills, Southern States, 1953-54 season

PERCENTAGE OF TOTAL VOLUME OF SHIPMENTS

State	100-pound bags	5- to 99-pound bags	Consumer packages under 5 pounds	Other	Type of container not reported	Total
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Arkansas[1]	67	8	16	9	0	100
Louisiana	80	3	5	1	11	100
Texas	61	([2])	27	12	0	100
Southern States	71	4	14	6	5	100
PERCENTAGE OF VOLUME FOR WHICH TYPE OF CONTAINER WAS REPORTED						
Arkansas[1]	67	8	16	9	--	100
Louisiana	90	3	6	1	--	100
Texas	61	([2])	27	12	--	100
Southern States	75	5	14	6	--	100

[1] Includes Tennessee.
[2] Less than 0.5 of 1 percent.

TABLE 25.--Power-driven equipment for loading and unloading rice at mills and detached driers and warehouses in the South, July 1, 1954

State and type of establishment	Type of equipment operated													
	Loading equipment[1]						Unloading equipment[1]							
	Gravity spout system[2]		Blower system		Other		Mechanical hoist for trucks		Power shovel		Suction system		Other	
	Establishments	Units operated	Establishments	Units operated	Establishments	Units operated	Establishments	Units operated	Establishments	Units operated	Establishments	Units operated	Establishments	Units operated
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Arkansas:[5]														
Mills	4	4	--	--	--	--	5	27	4	5	--	--	1	3
Detached driers and warehouses	25	40	1	1	--	--	26	32	--	--	--	--	--	--
Total	29	44	1	1	--	--	31	59	4	5	--	--	1	3
Louisiana:														
Mills	1	3	--	--	2	2	7	6	2	5	1	1	--	--
Detached driers and warehouses	58	86	--	--	--	--	87	105	--	--	--	--	--	--
Total	59	89	--	--	2	2	94	111	2	5	1	1	--	--
Texas:														
Mills	3	5	--	--	--	--	9	11	1	2	4	10	--	--
Detached driers and warehouses	66	95	20	20	--	--	75	94	2	2	--	--	--	--
Total	69	100	20	20	--	--	84	105	3	4	4	10	--	--
Southern States:														
Mills	8	12	--	--	2	2	21	44	7	12	5	11	1	3
Detached driers and warehouses	149	221	21	21	--	--	188	231	2	2	--	--	--	--
Total	157	233	21	21	2	2	209	275	9	14	5	11	1	3

See footnotes at end of table, page 44.

TABLE 25.--Power-driven equipment for loading and unloading rice at mills and detached driers and warehouses in the South, July 1, 1954--Continued

State and type of establishment	Type of equipment operated, Con.				Establishments operating equipment, type not indicated	Total establishments operating some type of equipment	Establishments not operating any equipment	Establishments not answering this question	Total establishments
	Equipment for either loading or unloading								
	Belt conveyor[3]		Forklift truck[4]						
	Establishments	Units operated	Establishments	Units operated					
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Arkansas:[5]									
Mills	6	10	--	--	1	11	5	--	16
Detached driers and warehouses	7	14	--	--	8	40	--	--	40
Total	13	24	--	--	9	51	5	--	56
Louisiana:									
Mills	17	37	1	2	4	21	19	--	40
Detached driers and warehouses	69	104	--	--	1	105	14	1	120
Total	86	141	1	2	5	126	33	1	160
Texas:									
Mills	7	14	2	24	--	11	1	--	12
Detached driers and warehouses	9	14	12	19	--	89	--	--	89
Total	16	28	14	43	--	100	1	--	101
Southern States:									
Mills	30	61	3	26	5	43	25	--	68
Detached driers and warehouses	85	132	12	19	9	234	14	1	249
Total	115	193	15	45	14	277	39	1	317

[1] All equipment shown in these columns is used for rice in bulk. Rice shipped in bulk is usually dried rough rice, but it includes some milled rice--notably brewers' rice.
[2] Including swivel loaders. Gravity-spout systems typically include power-driven elevators, which place the rice at a level from which gravity can do the loading.
[3] Used for moving dried rough or milled rice, whether in bulk or bags, or milled rice in packages.
[4] Used for handling dried rough or milled rice in bags, or milled rice in packages.
[5] Includes Mississippi and Tennessee.

TABLE 26.--Attitudes of rice mill operators toward using covered hopper rail cars for inbound movement of dried rough rice, Southern States, July-August 1954

State of mill	Operators in favor	Operators opposed	No opinion expressed	Total
	PERCENT OF TOTAL NUMBER OF MILLS			
	Percent	*Percent*	*Percent*	*Percent*
Arkansas[1]	74	13	13	100
Louisiana	50	40	10	100
Texas	25	75	0	100
Southern States	51	40	9	100
	PERCENT OF MILLS WHERE OPERATORS EXPRESSED OPINIONS			
Arkansas[1]	86	14	--	100
Louisiana	56	44	--	100
Texas	25	75	--	100
Southern States	57	43	--	100

[1] Includes Tennessee.

TABLE 27.--Extent and cost of cleaning railroad boxcars by rice mills and detached driers and warehouses, Southern States, 1953-54 season

Type of shipper and State	Establishments cleaning cars as percent of total establishments shipping by rail[1]	Average (median) number of cars cleaned as percent of cars loaded by individual establishments[2]	Average (median) cost of cleaning per car cleaned[3]	
			For bulk rice	For rice in bags or containers
Mills:	*Percent*	*Percent*	*Dollars*	*Dollars*
Arkansas[4]	7	(5)	(5)	(5)
Louisiana	50	86	(5)	.91
Texas	50	(5)	(5)	(5)
Southern States	40	81	(5)	.95
Detached driers and warehouses:				
Arkansas[6]	35	(5)	(5)	(5)
Louisiana	56	36	.73	(5)
Texas	47	60	.76	.83
Southern States	49	58	.77	.83
Mills and detached driers and warehouses:				
Arkansas[4] [6]	25	71	(5)	(5)
Louisiana	54	69	.78	.90
Texas	48	51	.77	.94
Southern States	47	63	.78	.91

[1] Of the total number of establishments, 83 percent made some rail shipments and reported the proportion of cars cleaned. No rail shipments were made by 17 percent.
[2] This computation is based only on those establishments whose operators reported that they did more than a nominal amount of cleaning of boxcars.
[3] This computation is based only on boxcars in which the establishments did more than a nominal amount of cleaning.
[4] Includes Tennessee.
[5] Insufficient data to warrant computation of average.
[6] Includes Mississippi.

TABLE 28.--Extent and cost of recoopering railroad boxcars by rice mills and detached driers and warehouses, Southern States, 1953-54 season

Type of shipper and State	Establishments recoopering cars as percent of total establishments shipping by rail[1]	Average (median) number of cars recoopered as percent of cars loaded by individual establishments[2]	Average (median) cost of recoopering per car recoopered[3]	
			For bulk rice	For rice in bags or containers
Mills:	*Percent*	*Percent*	*Dollars*	*Dollars*
Arkansas[4]	20	(5)	(5)	(5)
Louisiana	35	50	(5)	(5)
Texas	25	(5)	(5)	.90
Southern States	30	39	(5)	1.12
Detached driers and warehouses:				
Arkansas[6]	35	13	(5)	(5)
Louisiana	5	(5)	(5)	(5)
Texas	11	6	1.22	(5)
Southern States	12	6	1.76	(5)
Mills and detached driers and warehouses:				
Arkansas[4] [6]	29	9	1.51	(6)
Louisiana	15	51	(5)	(5)
Texas	13	6	1.23	.91
Southern States	18	9	1.74	1.14

[1] Of the total number of establishments, 83 percent made some rail shipments and reported the proportion of cars recoopered. No rail shipments were made by 17 percent.
[2] This computation is based only on those establishments whose operators reported that they did more than a nominal amount of recoopering of boxcars.
[3] This computation is based only on boxcars of which the establishments did more than a nominal amount of recoopering.
[4] Includes Tennessee.
[5] Insufficient data to warrant computation of average.
[6] Includes Mississippi.

TABLE 29.--Motor vehicles operated by rice mills and detached driers and warehouses in the South, in over-the-road service, July 1, 1954

Type of establishment and State	Vehicles and establishments								
	Straight trucks		Tractor-semitrailer combinations		Total vehicles		Establishments not answering this question	Establishments not operating any units	Total establishments
	Establishments operating any units	Units operated	Establishments operating any units	Units operated	Establishments operating any units	Units operated			
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Arkansas[1]									
Mills.....	1	1	3	6	4	7	1	11	16
Detached driers and warehouses	0	0	0	0	0	0	8	32	40
Total.....	1	1	3	6	4	7	9	43	56
Louisiana:									
Mills.....	7	13	7	20	11	33	4	25	40
Detached driers and warehouses	18	34	7	7	18	41	2	100	120
Total.....	25	47	14	27	29	74	6	125	160
Texas:									
Mills.....	4	7	2	4	5	11	1	6	12
Detached driers and warehouses	12	32	3	13	15	45	0	74	89
Total.....	16	39	5	17	20	56	1	80	101
Southern States:									
Mills.....	12	21	12	30	20	51	6	42	68
Detached driers and warehouses	30	66	10	20	33	86	10	206	249
Total.....	42	87	22	50	53	137	16	248	317

[1] Includes Mississippi and Tennessee.

TABLE 30.--Railroad movements of rice: 1 percent sample of carload waybills, by termination region according to State or region of origin, 1948-53 totals

State or region of origin	Termination region[1]								United States[2]	
	North Atlantic		East North Central		West North Central		Southern States other than rice States			
	Tons	*Percentage of total*	*Tons*	*Percentage of total*	*Tons*	*Percentage of total*	*Tons*	*Percentage of total*	*Tons*	*Percentage of total*
Southern rice States:										
Arkansas.....	666	26.2	2,064	27.1	596	31.4	3,711	55.8	21,304	23.9
Louisiana.....	220	8.7	2,396	31.4	423	22.3	1,465	22.0	23,633	26.4
Mississippi.....	0	0	0	0	0	0	42	0.6	512	0.6
Texas.....	446	17.5	1,290	16.9	402	21.1	1,387	20.8	35,184	39.4
Total.....	1,332	52.4	5,750	75.4	1,421	74.8	6,605	99.2	80,633	90.3
California.....	261	10.3	1,432	18.8	480	25.2	50	0.8	7,275	8.1
Other States.....	949	37.3	446	5.8	0	0	0	0	1,395	1.6
United States.....	2,542	100.0	7,628	100.0	1,901	100.0	6,655	100.0	89,303	100.0

[1] The composition of the specified regions is as follows: North Atlantic--New England plus New York, New Jersey, Pennsylvania; East North Central--Ohio, Indiana, Illinois, Michigan, Wisconsin; West North Central--Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas; Southern rice States--Arkansas, Louisiana, Mississippi, Tennessee, Texas; Southern States other than rice States--Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Alabama, Oklahoma. The ICC omits Tennessee from the waybill sample of rice movements because it has fewer than 3 shippers.

[2] Includes all regions of the United States, not merely those shown in table.

Interstate Commerce Commission, Carload Waybill Statistics.

TABLE 31.--Water movements of rice from the South and from California, by major port in continental United States, 1951-54

Port	Exports				Coastwise and intercoastal							
					Shipments				Receipts			
	1951	1952	1953	1954	1951	1952	1953	1954	1951	1952	1953	1954
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
Gulf ports:												
Lake Charles, La.....	179,849	268,036	243,297	196,764	33,994	28,490	32,064	43,563	--	--	--	--
Houston, Tex.....	129,533	208,781	156,403	147,264	2,534	1,608	1,858	887	--	206	--	--
New Orleans, La.....	61,758	80,589	44,572	58,279	26,228	31,158	33,198	39,858	--	--	11	10
Beaumont, Tex.....	21,647	27,071	28,939	22,961	45	1,643	202	703	--	--	--	--
Orange, Tex.....	251	8,622	7,414	6,244	--	--	--	--	--	--	--	--
Galveston, Tex.....	1,777	3,378	422	610	1,919	2,378	3,621	4,257	--	--	--	--
Texas City, Tex.....	--	--	--	--	44,543	42,759	52,110	57,597	--	--	38	--
West coast ports:												
Stockton, Calif.....	29,382	76,644	62,501	101,217	317	1,704	5,487	9,084	--	--	--	--
San Francisco, Calif....	26,063	66,691	51,752	58,689	94,455	105,682	91,955	35,671	--	--	--	30
Oakland, Calif.....	14,904	12,080	27,984	1,226	38,625	17,012	24,852	15,222	23	--	20	--
Atlantic ports:												
New York Port.....	1,953	1,647	1,915	119	--	--	51	--	59,747	63,215	74,405	84,446
Philadelphia Harbor.....	178	66	1	79	31	--	--	--	2,628	2,668	3,001	2,487
Jacksonville, Fla.....	6	159	99	77	--	--	--	--	--	--	--	2,074
Boston, Mass.....	1	--	--	--	23	--	--	--	535	67	939	860

Department of the Army, Corps of Engineers, Waterborne Commerce of the United States.

TABLE 32.--Average tons of rice per rail carload originated in the Southwestern region, selected years, 1929-54

Year	Average tons per carload	Percent of 1929 average
	Tons	*Percent*
1929	26.2	100
1934	28.3	108
1939	29.3	112
1941	31.0	118
1942	36.9	141
1943	43.7	167
1948	42.5	162
1950	39.3	150
1953	41.2	157
1954	40.8	156

Interstate Commerce Commission, Freight Commodity Statistics.

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